1867.

THE

UNITED SERVICE.

A MONTHLY REVIEW OF

MILITARY AND NAVAL AFFAIRS.

VOLUME XI.—NEW SERIES.

PHILADELPHIA:
L. R. HAMERSLY & CO.,
1510 CHESTNUT STREET.
1894.

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THE

UNITED SERVICE.

EDITED BY L. R. HAMERSLY.

JANUARY 1894.

THE EVOLUTION OF THE TORPEDO.

TORPEDOES, or infernal machines, as they were more formerly termed, first came into practical use during our Civil War, although such weapons of destruction were undoubtedly known previous to 1861; but the material then at the disposal of torpedoists was so exceedingly poor, and the knowledge existing at that time of the action and habits of these machines was so very limited, together with the fact that they were looked upon as abominable and unclean things, it is little wonder that the few attempts to put them into use of which there is any record should have resulted in complete failure. It is well known that the wonderful ingenuity displayed by the Confederates in planning and constructing submarine mines as well as spar-torpedoes was one of the principal causes of the protracted struggle between the North and the South. Towards the end of the war the Federals in self-defense were compelled to take to the spar-torpedo, so that it may be said that the submarine mine and the torpedo in the course of this great struggle leaped at one bound from the state of theory and experiment to become acknowledged once for all as fair, practical, and valuable weapons of offense and defense.

But in those days we had no rapid-firing or machine guns which would riddle any boat attempting to come within their range. Nothing but the old smooth-bore cannon, which took many precious minutes to adjust and jeopardized the life of whoever was ordered to "ram her up," so that it became comparatively easy for a well-trained boat's crew to creep up in the night, attach the spar to the ship, draw off, and explode the torpedo. Discovery did not mean death, as it would to-

day; it meant perhaps half of the crew being wounded or maimed, but nothing more, and in those days the spar was the surest and deadliest weapon of naval warfare. To-day all is changed. The piercing search-light, the rapid-fire and machine guns have come into play, and no boat would dare to, or in fact could, come within range of these rifles, —it would be inviting destruction. And even before these inventions it was seen that a self-propelling torpedo had to be devised which would have at least a directive range of half a mile and a fair maintainable speed, and these essential qualities in the Whitehead torpedo were first obtained.

About 1860 an Austrian officer designed a little boat to be propelled by steam or hot air, and guided by long ropes paid out from the shore as she advanced, and to carry in the nose of the boat forward a large charge of gun-cotton arranged to explode upon coming in contact with a ship's side. Subsequently the drawings passed into the possession of one Captain Luppis, of the Austrian navy, who made from them a little model to be run by clock-work. This model he took to Robert Whitehead, the owner of some workshops at Fiume, and together they strove to perfect the novel idea. Whitehead's son and a trustworthy workman were taken into the secret, and the outcome of their efforts must have surprised even themselves; for the strange vessel which they at last completed did not move *on*, but *under*, the water, and was not steered from the shore, but steered itself. For two years more they worked to perfect their new invention, closely guarding the secret of its propulsion. Then it was submitted to trial before a board of Austrian naval officers. Much to the disappointment of the board and the chagrin of the inventors, it was a failure, sometimes diving to the depth of at least forty feet and at others almost springing into the air. Nothing daunted, Mr. Whitehead said he would remedy the defect, and three weeks later he again submitted his weapon for trial, with such success that the board recommended the purchase of his secret by the Austrian government.

The possession of a fascinating weapon of such wonderful possibilities by any one nation of armed Europe made its purchase by all the others a certainty, and Whitehead sold its secret and the right to manufacture to each country, Turkey and the United States only declining, for about seventy-five thousand dollars.

"The invention of the Whitehead auto-mobile fish-torpedo pointed out a new channel for human thought," says Ensign Ellicott, in an interesting series of articles in *Harper's Weekly*, "to follow in searching for destructive weapons of naval warfare. No patent rights existed to deter other people from imitating the weapons if they could, but at the same time its mechanism remaining a secret prevented any improvement being made upon it except by the inventor himself. It was not until an imitation came into existence, possessing a distinct and vital

power which the Whitehead lacked, that torpedoists began to expect a rival weapon. The latter, the Howell torpedo, invented by Captain Howell, United States navy, passed quickly through the experimental stages, has been much improved, and is now an adopted and regularly manufactured auto-mobile fish-torpedo both in the United States and Europe."

Roughly described, the Whitehead torpedo consists of a cigar-shaped envelope of steel or phosphor bronze, containing six compartments for its propelling, directing, and exploding mechanisms. Its motive-power is compressed air; it is propelled by two two-bladed screws revolving in opposite directions about the same axis in order to centralize their individual tendencies to produce lateral deviation, and it is maintained at a constant depth by horizontal rudders, and on a straight course by vertical vanes set at an angle predetermined by experiment. The older models should maintain the prescribed depth and straight course for a distance of from four hundred to five hundred yards at a speed of twenty to twenty-four knots. The latest models, more fish-like in shape, fuller forward, and with a finer run, have attained a speed of thirty knots for four hundred and twenty-five yards, and twenty-four knots for eight hundred and seventy-five yards.

The general profile of the Howell torpedo is that of a spindle of revolution, the after-body being a true spindle, the middle a cylinder, and the fore-body an approach to an ogive. It has four distinct detachable sections,—the nose, which carries the firing-pin and its mechanism; the head, which surrounds the explosive charge and the detonator; the main section, wherein are placed the fly-wheel and screw-gears; and the stern section, which contains the driving mechanism. Briefly, it may be said that its motive-power is the fly-wheel, which is given, before launching, an enormous velocity of revolution by special appliances on board; this motion is communicated by mitre-wheels to the inner ends of screw-shafts, so that each screw makes eight hundred revolutions per minute to every thousand of the fly-wheel. In order to obtain its speed the fly-wheel of the Howell has to be spun up to nine thousand revolutions per minute by a machine separable from the torpedo before launching, and these revolutions must be maintained by the external machine during any delay in launching. It requires about two minutes to obtain these nine thousand revolutions upon the Howell, and it has been shown that the rotation can be maintained for an indefinite period.

In the earlier trials the Whitehead was superior to the Howell, so far as the possession of the four vital elements of success in a missile of destruction—velocity, range, rectilinear direction, and rending force —went, by about thirty per cent. in the velocity and range, while the Howell exceeded the Whitehead by the same percentage in rectilinear direction and rending force. In its trial the Howell was functioned

beautifully, all the torpedoes fired attaining the same results in initial dive, distance, speed, and submersion. This is a great advantage, as it does away with the necessity of making particular adjustments for each missile used. Outside contracts for the supply of Whitehead torpedoes have been awarded to Brooklyn firms, and these are under the inspection of the ordnance officers of the Brooklyn Navy-Yard. Not only have we in Providence a plant, owned mainly by the Hotchkiss Gun Company, for the manufacture of Howell torpedoes, but also one for the production of the Whitehead torpedoes on Long Island. Each of these innocent-looking weapons turned out costs almost two thousand dollars.

The possession of the Whitehead torpedo by all European nations has resulted in a careful elaboration of the modes of using it, and already three distinct and novel types of vessels devoted to its use have been developed, there now being of one of these types alone more than thirteen hundred in existence. I refer to the torpedo-boats, a class of little, unarmored steamers of enormously high speed, designed to dash at their adversaries in a *mêlée*, in a fog, or in the night, and fight them with torpedoes alone. Maritime nations have built these boats of three classes. The sea-going torpedo-boat is large enough to be at home in the high seas in average weather, and can accompany squadrons to operate at distant points. The next size, or first-class boats, are designed for harbor defense, only proceeding to sea in case of emergency to strike the enemy.

The second-class boats are of a smaller type, and are carried by battle-ships, to be hoisted out upon going into action. All boats are fitted with launching-tubes, or torpedo-guns as they are now being called,—one or two being fixed in the bow, and others mounted on turn-tables on the deck, each boat carrying as a fighting outfit two torpedoes for each tube. At first, compressed air was used to fire the torpedo from its tube, but now a small charge of gunpowder has taken its place.

No sooner had the torpedo-boat become an established type of fighting-vessel than war theorists decided that there must be a vessel especially designed to whip the torpedo-boat. Accordingly, there are now in existence in foreign navies one hundred vessels, of a class all their own, larger than sea-going torpedo-boats, but smaller than cruisers, built for a speed so great that they can overtake the torpedo-boats in chase, and armed with rapid-fire and machine guns with which to destroy their prey when overtaken. The variety of names applied to these craft is astonishing. Torpedo-vessels, torpedo-cruisers, torpedo-catchers, and *contretorpilleurs* (however that can be translated) are not more than half the terms applied, but torpedo-cruiser will probably prove to be the surviving name, for in the test of actual war these vessels will find a wider sphere of usefulness than in giving

chase to scampering small craft, and they may possibly supplant the fragile torpedo-boats entirely.

The third type of vessel now essential to torpedo warfare is the torpedo depot-ship. This is a very large second- or third-class cruiser, fitted up with complete workshops for repairing torpedoes, and carrying a number of spare torpedoes, and on her deck several second-class torpedo-boats. In an engagement such a vessel would avoid going into action so far as possible, and serve as a base of supply, from which her little torpedo-boats could sally forth at propitious moments to strike the enemy. A glance at some of the naval engagements in which the semi-modern torpedo has played a part may be interesting, though hardly forming a basis upon which to judge of their usefulness.

During the Russo-Turkish War, under that fearless English adventurer, Admiral Hobart Pasha, the Turkish fleet performed many daring acts, so its destruction by the torpedo was determined upon. Five Russian torpedo-boats were towed down from Odessa, and they found the Turkish fleet at Sulina. The weather was considered too bad to use Whiteheads, so but one boat made a dash at the enemy, intending to use a spar-torpedo. Admiral Hobart had surrounded his squadron with a cordon of guard-boats connected by a hawser. The daring torpedo-boat fouled on the hawser, impotently exploded its spar-torpedo, turned over, and sank.

When the next attempt was made Admiral Hobart was at Batoum. Here, besides his former precaution of guard-boats, hawsers, and booms surrounding his squadron, the admiral caused all fires and lights to be extinguished in the city after nightfall; so for three nights the Russians could not even find the city, much less the Turkish fleet. Then a traitor on shore was paid to build a fire upon the hill-side back of the town. Guided by this, the stealthy torpedo-boats glided upon their intended victims, but were quickly entangled among the booms and hawsers. Nevertheless, five Whitehead torpedoes were discharged with fairly accurate aim at the sleeping squadron. One struck the anchor chain of the flag-ship, glanced off, and went ashore. Another struck the armor belt of a companion ship near her bow, but glanced off before exploding, and did no damage. A third, for some unaccountable reason, exploded before hitting anything, while a fourth glanced from a boom, and went ashore. The fate of the fifth is unknown.

An excited, jabbering crowd gathered around the torpedoes, which lay lashing their tails on the beach, and evidently thought them two enormous fish.

Consternation fell upon the Whitehead manufacturers when it was known that these two torpedoes had fallen into the hands of the Turks, for if their lucrative secret was an unconditional prisoner of war its sales might be at an end. Whitehead hastened to confer with the

Turkish government, and finally got back his torpedoes on condition that he should charge Turkey nothing for the secret or the right to manufacture. Quite a profitable accident!

Another attempt was made upon the Turkish fleet at Batoum by two Russian torpedo-boats. Each fired a Whitehead torpedo, and one of the Turkish guard-boats, a small revenue steamer, was sunk. This closed the record of the Whitehead in that war; and, compared with the several important successes achieved during the same time with mines and spar-torpedoes, it was an insignificant record indeed.

At the bombardment of Alexandria the nature of the conflict did not allow the use of torpedoes. In the French Tonquin War spar-torpedoes only were used, the Chinese junks encountered probably not being worth the expenditure of a fifteen-hundred-dollar missile.

Despite all the theories advanced, all the peaceful experiments heretofore made, all the claims for and against the torpedo and the huge war-vessel, the fact remains that the practical success of the auto-mobile torpedo under conditions of actual warfare was first demonstrated by the sinking of the "Blanco Encalada," with the loss of more than two hundred lives. The "Blanco" was taken completely by surprise; but, once alarmed, the behavior of all on board seems to have been admirable. The rapid-fire guns were manned and the engineer's force went at once to their stations.

The torpedo-cruiser "Lynch," in the mean time, had made a less wide detour, and having crossed undetected the track of the "Condell," discharged her stern torpedo at a distance of fifty metres. Owing to some failure of the mechanism this torpedo sank at once upon leaving the tube. Captain Fuentes then ported his helm, and successfully launched his port bow torpedo, which gave the fatal blow.

The "Blanco" keeled over and sank in six fathoms of water, in a time variously estimated at from five to seven minutes, and within two minutes from the discharge of the last torpedo. Out of her complement of two hundred and eighty-five souls, Captain Goni and forty-four others alone were saved by swimming ashore. The entire engineer force was lost. In passing the fire of the "Blanco," which was very hot for a moment, both the "Condell" and "Lynch" escaped unhurt.

In drawing conclusions from this last—if it be not really the first—demonstration of modern torpedo warfare many discussions have naturally arisen among naval men. The fact that the *personnel* of the "Blanco Encalada" were wholly unaware of their impending danger was used as a basis upon which to build many an argument by those who depreciate the torpedo-boat. Against them are officers who assert that a surprise is one of the essential elements entering into such warfare, and that to the watchful and alert the opportunity comes.

The United States possesses no submarine boats whatever, but a year from now we will have a torpedo-cruiser capable of attaining a

speed of five or six knots under water, and perhaps ten or twelve on the surface. There are now a number of competitive designs before the War Department, and Congress has appropriated two hundred thousand dollars for the construction of a craft of this nature.

The principal general requirements of this boat are, first and foremost, safety, facility and certainty of action when submerged, speed when running on the surface, speed when submerged, endurance both when submerged and on the surface, offensive power, stability, visibility of object to be attacked.

The limit of displacement is fixed at one hundred and fifty tons, which may be as much less as will enable the constructor to embody the above features in the highest degree. The boat must be capable of carrying five auto-mobile torpedoes and fitted to fire two at a time, either when on the surface or when submerged.

The speed on the surface is to be as great as possible, and greater than when submerged. The vessel is planned to run on the surface except when necessary to avoid detection or pursuit. Endurance must be sufficient to enable the boat when submerged to run such a number of miles as would easily permit it to escape any pursuit.

Finality has most certainly not yet been arrived at in the matter of torpedoes, but that the torpedo will be the dominating factor in the next great naval war is hardly to be questioned; we may even see its destiny fulfilled within the next few months in Brazil. Be it as it may, the honor of every maritime nation may henceforth depend as much upon her submarine as upon her naval and military systems.

EUGENE ROBINSON.

ORIGIN AND DEVELOPMENTS OF STEAM NAVIGATION.[1]

CHAPTER I. 1543–1800.

A HISTORY OF STEAM NAVIGATION.

Early Experimenters: Blasco de Garray, 1543.—David Ramseye, 1630.—Salomon de Carrs, 1641.—Marquis of Worcester, 1663.—Denis Papin, 1690–95.—Thomas Savary, 1698.—M. Duguet, 1699.—Jonathan Hulls, 1736.—M. Gautoir, 1752.—David Bournoulli, 1753.—Euler, 1753.—Mathon de la Cour, 1753.—M. Gautoir, 1756.—M. Genevois, 1759.—Comte de Auxiron, 1774.—Perrier, 1775.—M. Ducrest, 1777.—Guyon de la Plombiere, 1776.—Andrew Ellicott, 1775.—Marquis de Jouffroy, 1778 and 1783.—Thomas Paine, 1778.—Matthew Washbrough, 1779.—Abbé Darical, 1782.—Desblancs, 1782.—James Rumsey, 1784 and 1788.—William Bushnell, Inventor of the Screw, 1784.—Joseph Bramah, 1785.—John Fitch, 1785–91.—Oliver Evans, 1788.—Nathan Read, 1788.—Patrick Millar, James Taylor, William Symington, 1788.—William Longstreet, 1790.—John C. Stevens, 1791.—Baron Seguier, 1792.—Earl Stanhope, 1792–94.—Elijah Ormsbee, 1792–94.—William Littleton, 1794.—Samuel Morey, 1794–97.—Edward Thomson, 1796.—Livingston, Stevens, and Roosevelt, 1800.—Hunter and Dickinson, 1800.—Edward Shorter, 1800.—Samuel Brown, 1800.

1543.—It has been asserted that Blasco de Garray, a native of Biscay, June 17, 1543, tried a vessel of two hundred and nine tons, called the "Trinity," with tolerable success, at Barcelona, in Spain, the motive-power of which consisted of a caldron of boiling water and a movable wheel suspended on each side of the vessel.

The story or legend of De Garray is this:

In 1543 a native mechanic of Marina, named Blasco de Garray, or, according to other accounts, a captain in the navy, the probability being he was made one for his invention, offered to exhibit in the presence of the Emperor Charles V. a machine by means of which a vessel might be impelled without the assistance of sailors or oars. The propo-

[1] Some twelve years ago the late Rear-Admiral George H. Preble, United States navy, wrote for the columns of the UNITED SERVICE magazine a "History of Steam Navigation." The papers ran a year and attracted wide-spread attention. When the series was finished the publishers of the UNITED SERVICE issued this history in book form, and the volume has been out of print for ten years and is now frequently asked for by libraries and book collectors. Under the circumstances we have concluded to reprint the whole series in the UNITED SERVICE for 1894, and the first paper appears in this issue.

sition appeared ridiculous, but De Garray was so convinced that the power of his machine would be adequate to the production of the effect announced, that he renewed his representations to the government, supplicating his majesty to command the execution of the project. The emperor, in consequence, appointed a commission to proceed to Barcelona to witness the experiment and to report upon the result. De Garray, secure now of making a proof of his invention, prepared a merchant ship called "La Trinidad," of two hundred tons burden, which came from Coubre to discharge a cargo of corn at Barcelona, of which Peter de Scary was captain (thus states the record), and the commissioners, Don Henry de Toledo, the Governor Don Pedro de Cordova, the Treasurer Ravago, and the vice-chancellor, having arrived, the experiment was made on the 17th of June, 1543. Immediately upon a given signal the vessel was put in motion; proceeding forward, it turned from one side to the other, according to the will of the steersman, and finally returned to the place whence it started, without the assistance of sails, oars, or any visible machinery, except an immense caldron of boiling water, a complicated number of wheels within, and paddles gyrating without. The multitude assembled on the sea-shore were filled with admiration at the sight of this prodigy, the port of Barcelona resounded with applause, and the commissioners, who witnessed the performance with the greatest enthusiasm, related to the emperor that De Garray had accomplished with his machine all he had undertaken to do. But the head of the commission, Ravago, who was the chief treasurer of the kingdom, through ignorance or some other of those unknown causes which influence the conduct of statesmen, showed himself little favorable either to the inventor or the machine. Confessing the success of the experiment, and expressing his approbation of the ingenuity of De Garray, he endeavored to persuade the emperor that the invention would be of little or no utility; that its complicated construction would require constant repairs, attended with immense expense; that the vessel would not proceed at the rate of much more than a league an hour, and more slowly when freighted; and finally, that the boiler, unable to resist the force of the steam for any extended period, would frequently burst and be productive of the most dreadful accidents. Such was the substance of the opinion given by this covetous or invidious minister. Though Charles V. was influenced by the representations of his treasurer, he was not insensible to the merits of the inventor, whom he promoted one grade to the rank of an officer, and in addition to paying him the expenses of the experiment, presented him with a reward of two hundred thousand *maravedis* from the royal treasury, equivalent to sixty-six thousand *reales de vellon*, a very considerable sum at that period, the munificence of which proves that the invention of De Garray equaled, if it did not surpass, the most extraordinary productions of that era.

This statement was first published in 1825, by Thomas Gonzales, who certified: "This account is derived from the documents and original registers kept in the royal archives of Simancas, among the commercial papers of Catalonia, and from those of the military and naval departments for the said 1543."

Mr. Woodroft, after a careful search among those papers, failed to discover the documents in question or any trace of De Garray's invention.

John MacGragor, Esq., in a paper read before the Society of Arts, April 14, 1858, stated:

"On the 23d of September last (1857) I visited the town of Simancas, near Valladolid, in Spain, with Captain John Ussher, to inspect some letters of Blasco de Garray, which are there preserved among the national archives.

"Having obtained the requisite royal permission, I was allowed, after much difficulty, to read (but not to copy) two letters signed by Blasco de Garray, written clearly in Spanish and well preserved. One of these was addressed from Malaga, the other from Barcelona; and both were dated A.D. 1543. They described two separate experiments with different vessels, *both of them moved by paddle-wheels turned by men.*

"One vessel was stated to be of two hundred Spanish tons burden, propelled by a paddle-wheel on each side, worked by twenty-five men. The other vessel was moved in a similar manner by forty men. The speed attained is mentioned in the texts, and is stated in a side-note (written in a different hand) to have been one league, or about three and a half English miles, per hour. Various calculations as to the tonnage, the motive-power, the cost, and other matters are contained in the letters, and it is said the vessels thus moved were found to steer well, but could be propelled more easily for a long time by oars. Also that, like other inventions, this would probably be improved by the experience of further trials. We read the letters carefully through, and *neither of them contained any mention whatever of the use of steam*, or any expression to indicate that this was contemplated."

There were no other letters of De Garray, or documents relating to his experiment, in the archives, and no traces of the relics of the machinery could be found at the school of artillery. Since Mr. MacGragor's visit M. Bergenroth has been allowed to copy the documents relating to De Garray.

1. A notograph from him to the emperor dated Malaga, September 10, 1540, containing his report on the trial of one of his paddle-wheel ships.

2. The report of Captain Des Ugasura on the same trial trip.

3. The report of the Provedores of Malaga concerning the same trip, dated July 24, 1540.

4. The report of Blasco de Garray to the emperor, dated July 6, 1543, concerning the trial trip of another of his paddle-wheel ships, made at Barcelona in June, 1543.

5. A letter of Blasco de Garray to Carrs, dated June 20, 1543. In *none of these is any reference to steam-power to be found.*

Blasco de Garray's connection with the invention of boats moved by steam, notwithstanding the prominence and general belief it has attained, may hereafter be dropped as having no foundation in fact.

1630.—In Sanderson's edition of Rymer's "Fœdera," vol. xix., there is a copy of a patent granted by Charles I. to David Ramseye, a groom of the privy chamber, dated January 21, 1630. Among its specifications is one "to raise water from low pits by fire," and another "to make boats, shippes, and barges to go against strong wind and tide."

1641.—The following letter written by Marion Delorme, dated at Paris, February, 1641, suggested to Dumas one of the best scenes in one of his wonderful romances:

"PARIS, February, 1641.

"MY DEAR EFFIAT,—While you were forgetting me at Narbonne, and giving yourself up to the pleasures of the court and the delight of thwarting M. le Cardinal de Richelieu, I, according to your express desire, am doing the honors of Paris to your English lord, the Marquis of Worcester; and I carry him about, or rather he carries me, from curiosity to curiosity, choosing always the most grave and serious, speaking very little, listening with great attention, and fixing on those whom he interrogates two large blue eyes, which seem to pierce to the very centre of their thoughts. He is remarkable for never being satisfied with any explanations which are given him; and never sees things in the light in which they are shown to him. You may judge of this by a visit we made together to Bicêtre, where he *imagined he had discovered a genius in a madman.*

"If this madman had not been actually raving I verily believe your Marquis would actually have entreated his liberty, and have carried him off to London, in order to hear his extravagances from morning to night at his ease.

"We were crossing the court of the mad-house, and I, more dead than alive with fright, kept close to my companion's side, when a frightful face appeared behind some immense bars, and a hoarse voice exclaimed, '*I am not mad! I am not mad! I have made a discovery which would enrich the country that adopted it!*' 'What has he discovered?' I asked the guide. 'Oh,' he answered, shrugging his shoulders, 'something trifling enough,—you would never guess it: IT IS THE USE OF THE STEAM OF BOILING WATER.' I began to laugh. 'This man,' continued the speaker, 'is named SALOMON DE CARRS;

he came from Normandy four years ago, to present to the king a statement of the wonderful effects that might be produced from this invention. To listen to him you would imagine that with steam you COULD NAVIGATE SHIPS, move carriages,—in fact, there is no end to the miracles which, he insists upon it, could be performed. *The cardinal sent the madman away without listening to him.* SALOMON DE CARRS, far from being discouraged, followed the cardinal wherever he went, with the most determined perseverance, who, tired of finding him forever in his path, and annoyed to death with his folly, ordered him to be shut up in the Bicêtre, where he has now been for three years and a half, and where, as you hear, he calls out to every visitor that *he is not mad, but that he has made a valuable discovery.* He has even written a book upon the subject, which I have here.'

"Lord Worcester, who had listened to this account with much interest, after reflecting a time, asked for the book, of which, after reading several pages, he said, 'This man is not mad. In my country, *instead of shutting him up,* he would have been rewarded. Take me to him, for I should like to ask him some questions.'

"He was accordingly conducted to his cell, but after a time he came back sad and thoughtful. 'He is indeed mad now,' said he; 'misfortune and captivity have alienated his reason, but it is you who have to answer for his madness. When you cast him in that cell you confined THE GREATEST GENIUS OF THE AGE!' After this we went away, and since that time he has done nothing but talk of SALOMON DE CARRS. Adieu! my dear and faithful Henry. Make haste and come back, and pray do not be so happy where you are as not to keep a little love for me.

"MARION DELORME."

1651.—An anonymous pamphlet was published in London in 1651, entitled "Inventions of Engines of Motion lately brought to Perfection," etc. The author claims "to have erected one little engine or great model at Lambeth," which among its capabilities was intended "*to draw or haul ships, boates, etc.,* up river against the stream." Steam is not indicated in the pamphlet, but it is difficult to conceive any other agent, unless some explosive compound by which the pressure of the atmosphere was exerted.

1663.—The Marquis of Worcester published a little book in 1663, which he called "A Century of the Names and Scantlings of Inventions." In it he evidently describes an engine capable of raising water by the repellant power of steam. In this book one hundred inventions are enumerated, but the account of each is so short as often to be very obscure. Among his other boasts he says, "I can make a vessel, of as great a burden as the river can bear, to go against the stream, which the more rapid it is the faster it shall advance, and the

movable part that works it may be by one man still guided to take advantage of the stream, and yet steer the boat to any point; and this engine is applicable to any vessel or boat whatsoever, without therefore being made on purpose; and it worketh these effects,—it moveth, it draweth, it driveth (if need be) to pass London Bridge against the stream at low water; and a boat lying at anchor, the engine may be used for loading and unloading." A recent investigation of his patent shows, as it is expressly so stated, that he had no idea of using steam, but "the force of the wind or stream caused its motion."

1690.—Denis Papin, a French engineer, who was forced, after the revocation of the Edict of Nantes, to quit his country, took refuge at the court of the landgrave of Hesse, and was a professor of mathematics at the University of Marburg during several years. In 1690 he published a methodical and clear description of the fire-engine, now known as the atmospherical engine, and suggested the practicability of applying the power of steam to the navigation of rivers.

1695.—Papin, in another work dated 1695, says, "It would be too long to describe here in what manner this invention (the atmospherical engine) could be applied to drain rivers, throw bombs, and *row against wind.* I cannot abstain from remarking how much this power would be preferable to that of galley-slaves to navigate with rapidity the sea." Papin next criticises the use of men as agents, who, he says, occupy a larger space, and consume a great deal, even when they do no work, and observes that his tubes or pumps would be less cumbersome; "but," he adds, "as they cannot be conveniently adapted to ply common oars, it would be necessary to apply to them rotatory oars." He mentions having seen oars of that description fixed to an axle-tree in a boat belonging to Prince Robert of Hesse, which were turned by horses. He thought, however, that they might be put in motion by the *aid of a steam-engine.* To Denis Papin is attributed the invention of the safety-valve.

The "Encyclopædia Britannica" appears to think that Papin's suggestions for the application of steam to navigation must be considered as theory alone, never carried out. But his correspondence with Leibnitz, which has recently been brought to light, fully proves *that he actually constructed a steamboat which he navigated upon the river Fulda in* 1707, which boat may serve as a warning to men not to be too clever for their age. M. Fournier relates that Papin labored at his construction for some years at Hanau, and that at Cassel the boat was launched in presence of the landgrave. The experiment succeeded, but he derived from it only scorn, ridicule, and abuse. He was treated as a charlatan and a fool. Disgusted with the conduct of the Hessians, Papin attempted to go to London in his steam-vessel. He descended the Fulda as far as Münden, and was entering the Weser, formed by the union of the Fulda and Werra, when the boatmen of

Münden, envious or suspicious of what might arise from the invention, laid violent hands upon him and his boat. He escaped with difficulty, but his boat was destroyed. He tried in vain to obtain redress; and then came to reside in London, where he died three years afterwards (1710) without having built a new boat.

1698.—July 25, 1698, Captain Thomas Savary, an Englishman, took out a patent for raising water by the impellant force of fire. The same year he recommended the use of paddle-wheels similar to those now employed on steam-vessels, though without in the remotest degree alluding to his engine as a prime mover. It is probable he intended to employ the force of men or animals working a winch. In 1696 he obtained a patent for rowing ships with greater ease and expedition than had hitherto been done by any other. In 1698 "*he believed steam might be made useful to ships,*" but not daring to meddle with the matter, left it to the judgment of those who were better judges of maritime affairs.

1699.—M. Duguet appears to have tried revolving oars; and experiments were made with them on a large scale, both at Havre and Marseilles. This mode was soon given up as impracticable.

1736.—John Barrow, under-secretary of the admiralty, in his autobiography says, "Neither Lord Stanhope, nor Fulton, nor the American Livingston, nor Patrick Millar, nor his assistant Symington, have the least claims of priority to the application of steam and wheels for propelling vessels. There can be no doubt that Jonathan Hulls was the real inventor of the steamboat."

Jonathan Hulls was a man of no ordinary capacity, but we cannot admit that "he was the inventor of the steamboat;" that must be conceded to Papin, who actually moved a boat by the power of steam on the Fulda in 1707. He, undoubtedly, in a rough way, was the first Englishman to point out how steam might be employed in the propulsion of vessels. His scheme was clever, but speculative. It did not obtain any practical trial, and like many other efforts of genius, came to nothing. John Scott Russell, in the "Encyclopædia Britannica," however, asserts that Hulls not only made a model of his invention, but that a boat was actually constructed and usefully employed.

According to the tradition of the neighborhood in which Hulls was born, he was the son of a mechanic of Hanging-Aston, near Campden, Gloucestershire; his name being entered in the baptismal register December 17, 1699. Thomas Hull, or Hulls, the father, having removed from Aston to Campden, the boy was educated at the ancient grammar school there. With a natural turn for mechanics, Jonathan Hulls was brought up as a clock-maker, or rather clock-mender,—one of an humble class of artisans whose business it is to make a circuit through a district, cleaning and repairing cottage and farm-house clocks,

and the clocks of churches. He married early, and settled in the hamlet of Broad Campden about 1729.

During the earlier years of manhood Hulls bore the reputation of being a thoughtful and studious man, and his neighbors regarded his superior mental powers with no small degree of respect. It is asserted that the idea which has given him claim to posthumous honor occurred to him while he was yet young, and was matured in his mind long before any channel was opened through which he could make it known to the world; for Hulls had a family to support, and no means beyond his precarious handicraft. A patron at last appeared in Mr. Freeman, of Batsford Park, whose seat (now that of Lord Redesdale) is about a mile from Aston, the native place of the inventor. With the funds provided by this gentleman Hulls was enabled to go to London to procure a patent and to publish the pamphlet in which his invention is described.

Hulls's patent is dated December 21, 1736, when he was thirty-seven years old, and bears the sign-manual of Queen Caroline as a witness. In this instrument the invention is described as a "machine for carrying ships and vessels out of or into any harbor or river against wind and tide;" and further, it sets forth that as the inventor could not at that time "safely discover the nature of his invention," he might afterwards enroll a description of the same in the High Court of Chancery.

The little pamphlet in which Hulls made his scheme known to the world was printed in London in 1737. It is entitled "A Description and Draught of a new-invented Machine for carrying Vessels or Ships out of or into any Harbour, Port, or River against Wind and Tide or in a Calm." In his preface he says, "There is one great hardship lies too commonly upon those who propose to advance some new though useful scheme for the public benefit. The world abounding more in rash censure than in a candid and unprejudiced estimation of things, if a person does not answer their expectations in every point, instead of friendly treatment for his good intentions, he too often meets with ridicule and contempt. But I hope this will not be my case, but that they will form a judgment of my present undertaking only from trial. If it should be said that I have filled this tract with things that are foreign to the matter proposed, I answer: There is nothing in it but what is necessary to be understood by those who desire to know the nature of that *machine* which I now offer to the world, and I hope that, through the blessing of God, it may prove serviceable to my country."

Mr. Hulls proposed to put his engine into a *tow-boat*, and in discussing its advantages says, "If this machine is put in a separate vessel, this vessel may lie in any port, etc., to be ready on all occasions. A vessel of small burden will be sufficient to carry the machine to

take out a large one. A vessel will serve for this purpose for many years after she is not safe to be taken abroad." Alluding to the wheel being at the stern, "When the wind comes ahead of the tow-boat the fans will be protected by it; and when the wind comes sideways the wind will come edgeways of the fans, and therefore strike them with less force." Again he says, "The work to be done by this machine will be upon particular occasions, when all other means yet found out are wholly insufficient. How often does a merchant wish that his ship were on the ocean, when if she were there the wind would serve tolerably well to carry him on his intended voyage, but does not serve at the same time to carry him out of the river, etc., he happens to be in, which a few hours' work of this machine would do."

Hulls gives a full description of all the mechanism of this steamboat, and shows how steam is applied, and the comparative advantages of having the steam machinery in the ship itself, or in a separate towboat. He seems to have studied the matter very fully, even to the consideration of the relative expense, and there seems to be no doubt of his having been the first inventor of an ingenious and practicable mechanism for propelling vessels by a condensing steam-engine and by paddle-wheels.

This pamphlet seems to have attracted no attention, and Freeman, unwilling to risk further outlay, abandoned Hulls and his project. It is evident that the invention did not receive a practical trial, and whatever hopes the projector based upon its success were disappointed. Commercially, like all the ventures of Jonathan Hulls, it proved a complete failure. Incurring some derision from his want of success, he quitted the place where he was best known and hid himself among the crowds of London with what might be called a broken heart, and died in extreme poverty, the date of his decease being unknown.

The following doggerel is still the burden of a common street-ditty among the boys of Campden in Gloucestershire, Hulls's native place:

"Jonathan Hulls,
With his patent skulls,
Invented a machine
To go against wind and stream;
But he, being an ass,
Couldn't bring it to pass,
And so was ashamed to be seen."[2]

1752.—Gautoir, a regular canon, and professor of mathematics, presented to the Royal Society of Nancy a memoir, in which, having shown the inconveniences of navigation by means of sails, he proposed to employ a fire-engine (*machine feu*) of his invention for navigating purposes.

In 1851 there was discovered in the archives of Venice a treatise

[2] *Notes and Queries*, vol. iii., first series.

on "Navigation by Fire," by M. Gautoir, member of the Royal Society of Paris, which shows that the professor's plans for steam navigation were exhibited by him to the Venetian republic in 1756.

1753.—Daniel Bournoulli wrote a memoir mathematically proving that a steam-engine might be advantageously used in vessels, which obtained a prize from the French Academy of Sciences.

His proposition was to propel vessels by wheels, with vanes set at "an angle of sixty degrees both with the arbor and keel of the vessel, to which the arbor is placed parallel. To sustain this arbor and the wheels two strong bars of iron, of between two and three inches thick, proceed from the sides of the vessel, at right angles to it, about two feet and a half below the surface of the water." The propellers for the stern he describes to be of similar construction, but shorter, and for driving them he says they "can be moved by men aboard the vessels, or *by steam-engines*, or on rivers by horses placed in the barges."

Bournoulli's plan is described, and several modifications proposed, in "Annales des Arts et Manufactures," tome xx. p. 329 (A.D. 1803). These represent, by drawings, shafts annexed at the sides, bow, and stern of the vessel. Each shaft carries eight wheels, each wheel having eight spokes, with inclined broad vanes at the ends. It is suggested that a shaft might go out at the stern, under water, through a stuffing-box, and means are described for raising the shaft which is under water. The steam-engine is proposed to be used to turn the shaft by having a T cross-head on the piston-rod, working vertically, with a crank or connecting-rod at each end, turning wheels, one of which works the shaft.

In 1753, Euler proposed to use a shaft with four floats at right angles. This was worked by a vertical shaft with a toothed wheel and pinion. Fincham's "History of Naval Architecture" has a drawing of this device.

The same year "Mathon de la Cour proposed floats on each axle, and the intervention of an endless cord passing over a drum at the end of the axle, which was fastened to the side of the ship, and over a corresponding drum annexed to the frame."[3]

1759.—M. Genevois, a Swiss clergyman of the canton of Berne, published at Geneva a book containing what he called the discovery of the "*Great Principle.*" This was to concentrate power, by whatever means obtained, into a series of springs, which might be applied to a variety of purposes, among which he suggested the application of the "Great Principle" to propel a vessel by oars, and also proposed the application of an atmospheric steam-engine to bend or empower the springs by which the oars were to be worked; but his favorite project appears to have been to accomplish that object by the expansive force of gunpowder. M. Genevois visited England in 1760 and submitted

[3] Fincham's History of Naval Architecture, London, 1851, p. 280, for drawing.

his plan to the Board of Admiralty, without receiving any encouragement. His apparatus resembled in principle the feet of aquatic birds, opening when moving through the water in one direction, and closing on its return.

1774.—The Comte de Auxiron made an experiment, but his boat moved so slowly and irregularly that those who had been at the expense of the trial at once abandoned all hopes of success.

1775.—The elder Perrier, for whom M. Arago claimed the honor of having constructed the first steamboat, and who was afterwards celebrated as the introducer of the manufacture of steam-engines into France, constructed in 1775 a vessel impelled by a steam-engine; but the power of the engine was so small—being scarcely that of one horse—that it could not impart sufficient velocity to the vessel to ascend the river Seine to advantage. Not discouraged, and ascribing his failure to the use of paddle-wheels, he applied himself for several years to the search for other substitutes for oars. It does not, however, appear that he made any valuable discovery. M. Ducrest published a work in 1777 which contains an account of various experiments made by Perrier in his presence.

In 1776, Guyon de la Plombiere suggested the use of the steam engine for propelling a vessel.[4]

Mr. Andrew Ellicott, an American, in 1775, states that he had a conversation on the subject of steam with Mr. William Henry, of Lancaster, who suggested the possibility of applying steam to vessels, as did also Mr. Thomas Paine, the author of "Common Sense," in 1778.

1778.—The Marquis de Jouffroy made his first experiments, in 1778, at Baumes les Dames, and in 1781 he built upon the Saône a steam-vessel one hundred and forty feet long by twenty feet wide. In 1783 his experiments became the subject of a favorable report made to the French Academy of Sciences by Borda and Perrier. M. de Jouffroy demanded a patent, but before it was granted, the Revolution compelled him to emigrate. On his return to France, in 1796, he learned that M. de Blanc, an artist of Trévoux, had obtained a patent for the construction of a steamboat.

1779, March 10.—Matthew Washbrough took out a patent for machinery to be attached to a steam-engine, one use of which he mentions as follows: "Lastly, I intend to apply my engine, as described above, for the purpose of moving ships, boats, and lighters, or any vessel in water."

1782.—The Abbé Darical proposed several plans, which were not superior to Perrier's, and were speedily laid aside. In 1782, Desblancs sent a model to the Conservatoire des Arts et Métiers of a steamboat moved by a chain of floats carried by wheels at its side turned by a horizontal cylinder.

[4] Encyclopédie Moderne, Paris, 1855. Article "Vapeur," 171.

1783.—In the great Patent Office Library, England, there is a French print by Jamont, dated A.D. 1816, entitled "Plan et profil du Bateau à Vapeur exécuté par M. le Marquis de Jouffroy à Lyon, en 1783." It represents a steamboat one hundred and forty feet long, with paddle-wheels on a shaft turned by a single horizontal steam cylinder and piston, with a double rack work and pauls on the piston-rod.

"An experiment was tried in the river Thames on a coal-barge to work against the tide by means of an apparatus fixed to the sides; so contrived that when put in motion, which was done by a fire-engine, it rowed three pair of oars, and required only the assistance of one man to steer. It seems rather too complex a business in its present state, but the plan appears practicable, and should it succeed by some judicious constructing, it must prove of immense advantage to the [coal?] trade."[5]

1784.—Moses Hunter, May 19, 1788, certifies that November, 1784, being at Richmond, Virginia, attending the Assembly as a representative from Berkeley County, Mr. James Rumsey, a working bath-tender, informed him in confidence that "he intended to construct a boat which was to be wrought altogether by steam; that he had tried the principles, some of which he mentioned." From the tenor of the conversation, he understood Rumsey that his principal dependence for the operation of his boat was upon steam. A rude model was exhibited to a company of visitors at Berkeley Springs in the year 1784. George Washington was one of the favored few who witnessed the successful launch of the little boat and testified to the value of the discovery. Fearful of his invention being stolen, Rumsey appears to have sworn all who witnessed the experiment to secrecy, for the certificate given him by General Washington, and meant for publication, is so carefully worded as to avoid using the word steam. It reads:

"I have seen the model of Mr. Rumsey's boat, constructed to work against the stream; examined the powers upon which it acts; been eye-witness to an actual experiment in running waters of some rapidity; and give it as my opinion (although I had little faith before) that he has discovered the art of working boats by mechanism and small manual assistance against rapid currents; that the discovery is of vast importance, may be of the greatest usefulness in our inland navigation; and if it succeeds, of which I have no doubt, the value of it is greatly enhanced by the simplicity of the work, which, when explained, may be executed by the most common mechanic.

"Given under my hand and seal, in the town of Bath, county of Berkeley, in the State of Virginia, this 7th day of September, 1784.

"GEORGE WASHINGTON."

[5] *British Magazine and Review*, October 26, 1783.

In 1785 Rumsey gave a public exhibition on the Potomac, above Shepherdstown, Virginia, of his discovery that a boat could be propelled *by steam* up-stream against the current. The boiler and machinery for Rumsey's boat were made at the Catoctin Iron Furnace, in Frederick County, owned by Johnson and brothers. Afterwards, encouraged by his success, he sailed for England, but first destroyed his precious model. He hoped in that older and richer country to perfect his work and realize fame and fortune. Doomed to disappointment, after a long and harassing struggle, he died before completing and satisfactorily demonstrating the principles of a new model. Rumsey accused Fitch of "coming pottering around" his Virginia work-bench and carrying off his ideas, to be afterwards developed in Philadelphia. Rumsey died in England of apoplexy at a public lecture where he was explaining his inventions.

A gentleman not many years ago had in his possession letters written by Rumsey in London, which mentioned his receiving frequent visits there from a young American studying engineering, who showed a sympathetic and intelligent interest in Rumsey's labors. This young man was *Robert Fulton*, who, nineteen years *after* Rumsey's death, gave the world a successful steamboat.

1785.—Thomas Jefferson, writing from Paris in 1785, describes a vessel recently invented, which he examined while in operation. He says the inventor did not know the principle of his own invention. "It is a screw with a very broad or thin worm, or rather it is a thin plate, with its edge applied spirally round an axis. This being turned operates on the *air* as a screw does, and may be literally said to screw the vessel along. . . . The screw, I think, would be more effectual if placed below the surface of the water." Mr. Jefferson adds that he thinks Mr. Bushnell, of Connecticut, has a prior claim to the invention of the screw as a motive-power for vessels. During our Revolutionary War he invented a submarine torpedo-vessel, to be driven by screws. This torpedo was the original of Fulton's, and may have been the first instrument of its kind; but the screw had been suggested as a motive-power for vessels long before. Brande's Dictionary says that "the screw-propeller is probably as old as the windmill, and a windmill of the construction now usually employed is represented in the seventy-seventh proposition of Hero's 'Spiritalia,' a work written one hundred and thirty years before the Christian era."

For a century and a half efforts were made to introduce the screw as a propeller of vessels before Ericsson and Smith successfully demonstrated the utility of the screw, and its advantages over paddle-wheels.

The first attempt to connect a steam-engine with a screw-propeller was by Joseph Bramah, of Piccadilly, engine-maker, who on the 9th of May, 1785, took out a patent for improvements in machinery, including two new methods of propelling vessels through the water.

The first of these contrivances was the application of a paddle-wheel to the stern of the vessel, driven by a steam-engine, the rudder being placed in the *bow*, in order to facilitate this contrivance.

His other invention was the application to the stern of the vessel of "a wheel with inclined fans or wings, similar to the fly of the smoke-jack or the vertical sails of a windmill." This wheel was to be fixed on the spindle of the rotatory engine without intermediate gearing, and wholly under water, where, by being turned either way, it would force the ship backward or forward, as the inclination of the fans or wings would act as oars with equal force both ways, and their power be in proportion to the size and velocity of the wheel, allowing the fans to have a proper inclination. Where the engine-shaft passed through the vessel it was to be made tight with a *stuffing-box*.

This is considered to be the *first* attempt at coupling together a submerged screw-propeller and the steam-engine for the propulsion of vessels, but there is no evidence that Bramah ever made or tried a propeller, and his rotatory engine by which it was to be driven turned out a failure.

At a special meeting of the American Philosophical Society of Philadelphia, held on the 27th of September, 1785, John Fitch laid before it a drawing and description of a machine for working a boat against a stream by means of a steam-engine, and on the 2d of December following presented a copy of the model and drawing to the Society, as appears by the minutes of Samuel Magan, one of the secretaries.

In the latter part of the year Fitch set out from Philadelphia with a view of visiting Kentucky, but he turned aside from his purpose at Richmond, and petitioned the Legislature of Virginia for assistance for his steamboat. No formal report was made, but believing that the experiment would not be costly, he executed a bond to Patrick Henry, governor of Virginia, conditioned that if he should sell one thousand copies of his map of the Western country in that State at 6*s*. 8*d*. each, he would, in nine months thereafter, exhibit a steamboat in the waters of Virginia or forfeit the penalty of three hundred and fifty pounds.

In November of the same year he received from Patrick Henry, the governor of Virginia, the following certificate:[6]

"I certify that John Fitch has left in my hands a bond, payable to the Governor for the time being, for £350, conditioned for exhibiting his *steamboat* when he receives subscriptions for one thousand of his maps, 6*s*. 8*d*. each.

(Signed) "P. HENRY.

"November 16, 1785."

[6] United States Patent Reports, 1849–50.

This provision was never put in operation, because the sales of the maps were very small. On his return to Pennsylvania to print the maps he stopped at Philadelphia, and presented a petition for assistance to the Legislature of Pennsylvania, and immediately afterwards went to Annapolis and made a similar application to the Legislature of Maryland. These attempts were unsuccessful, and an effort to induce the State of New Jersey to appropriate one thousand pounds of loan certificates for the purpose of building a steamboat also failed. Shortly afterwards the Legislature of the latter State enacted a law giving to John Fitch the exclusive right for fourteen years of making and using all and every species of boats and water-crafts which might be urged or propelled by fire or steam in the waters of the State. He then returned to Philadelphia, and succeeded in forming a company. The stock was divided into forty shares. The original subscribers were Samuel Vaughn, Richard Wells, Benjamin W. Morris, John Morris, Joseph Budd, John and Chamless Hart, Thomas Say, Magnus Miller, Gideon Hill Wells, Thomas Palmer, Thomas Hutchins, Richard Wells, Jr., John Strother, Israel Israel, William Reubel, and Edward Brooks, Jr., each of whom had one share; Richard Stockton, of Princeton, three shares; Benjamin Say, two shares. Stacy Potts, of Trenton, was an early member of the company, but soon withdrew from it. In the beginning it was agreed that Fitch should have twenty shares for his interest and services in the experiment. The first difficulty of the company was about the making of a steam-engine. The assistance of Henry Voight, an ingenious clock- and watch-maker of Philadelphia, whom Fitch looked upon as a practical man of sound sense and experience, was obtained, and shares were gradually made over for his services, until in 1787 he held five.

1786.—The subscribers generally paid in twenty dollars each on their shares, and with this small sum the experiments were commenced. A model steam-engine, with a cylinder of one inch diameter, was made, but although it worked, it was too small to demonstrate anything. A new model, with a three-inch cylinder, was then made and applied to a small skiff. With this machinery trials were made on the Delaware, about the 20th of July, 1786, with "a screw of paddles," a screw-propeller, the endless chain, and the side wheels, without much success. The next night, while in bed, Fitch thought of a plan of rowing the boat by oars or paddles on the sides, to be moved by cranks worked by machinery. He immediately rose and drew a plan, and the next morning showed it to Voight, who approved of it with some modifications. This was afterwards tried on the skiff with the steam-engine, and the first boat successfully propelled by steam in America was moved in the Delaware on the *27th of July*, 1786, with flattering promises of the future usefulness of the invention.

The members of the company were so much pleased with its success

that they determined to build a steamboat for practical use, as a passage and freight boat. But the original subscriptions were now exhausted, and the shareholders were tardy in the payment of new installments. Fitch induced a committee of the Assembly of Pennsylvania to report, in September, in favor of loaning him one hundred and fifty pounds; but the House rejected the report by a vote of twenty-eight yeas to thirty-two nays. Application was made to General Mifflin without success. Matters then languished for a while, during which a law was passed by the State of Delaware securing (1787) Fitch's right to the invention. A new deed was signed by the shareholders in February, 1787, and fresh advances were made. The engine was to be of twelve-inch cylinder, and the boat twelve feet beam and forty-five feet long. The engine was finished in May, 1787, but "the wooden caps" to the cylinder admitted air, and the piston was leaky. The works were all taken out to the foundation and set up again, when the condensation was found to be imperfect. New condensers and other machinery were made, and the boat moved at times as fast as three or four miles an hour. But something was continually going wrong. The work was very imperfect, the details of such machinery being unknown in America, and the workmen common blacksmiths. By entreaty the company was induced to persevere. On the 22d of August, 1787, this boat was propelled on the Delaware in the presence of nearly all the members of the convention to frame the Federal Constitution; but the rate of progress was too slow to satisfy the projector. Nevertheless, certificates of the perfect success of this attempt were given by Governor Randolph, of Virginia, Dr. Johnson of the same State, David Rittenhouse, the astronomer, Andrew Ellicott, professor in the Episcopal Academy, and Dr. John Ewing, of the University.

The following is the certificate of David Rittenhouse:

"This may certify that the subscriber has frequently seen Mr. Fitch's (John Fitch) steamboat, which with great labor and perseverance he has at length completed; and has likewise been on board when the boat was worked against both wind and tide, with considerable velocity, by *the force of steam only*. Mr. Fitch's merits in constructing a good steam-engine, and applying it to so useful a purpose, will no doubt meet with the encouragement he so richly deserves from the generosity of his countrymen, especially those who wish to promote every improvement of the useful arts in America.

(Signed) "DAVID RITTENHOUSE.

"PHILADELPHIA, December 12, 1787."

1786.—Fitch a year earlier communicated to the *Columbian Magazine* this description of his steamboat:

"PHILADELPHIA, December 8, 1786.

"TO THE EDITOR OF THE COLUMBIAN MAGAZINE:

"SIR,—The reason of my so long deferring to give you a description of the steamboat has been in some measure owing to the complication of the works, and an apprehension that a number of drafts would be necessary in order to show the powers of the machine as clearly as you would wish. But as I have not been able to hand you herewith such drafts, I can only give you the general principles. It is in several parts similar to the late improved steam-engines in Europe, though there are some alterations. Our cylinder is to be horizontal, and the steam to work with equal force at each end. The mode by which we obtain what I take the liberty of terming a vacuum is, we believe, entirely new, as is also the method of letting the water into it, and throwing it off against the atmosphere without any friction. It is expected that the engine, which is a twelve-inch cylinder, will move with a clear force of eleven or twelve hundred weight after the frictions are deducted; this force to act against a wheel of eighteen inches diameter. The piston is to move about three feet, and each vibration of the piston gives the axis about forty evolutions. Each evolution of the axis moves twelve oars or paddles, five and half feet, which work perpendicularly, and are represented by the stroke of the paddle of a canoe. As six of the paddles are raised from the water six more are entered, and the two sets of paddles make their strokes about eleven feet in each evolution. The cranks of the axis act upon the paddles about one-third of their length from the lever end, on which part of the oar the whole force of the axis is applied. Our engine is placed in the boat about one-third from the stern, and both the action and reaction turn the wheel the same way.

"With the most perfect respect, sir, I beg leave to subscribe myself,

"Your very humble servant,

"JOHN FITCH."

Oliver Evans, in 1814, affirmed before a justice of the peace in Washington, D. C., that when Fitch and his company were constructing their steamboat in Philadelphia he suggested the propelling of her by paddle-wheels at the sides. One of the company, Dr. William Thornton, had also urged the use of wheels at the sides, but Fitch objected to their use. He also affirmed that Fitch declared his intention to establish steamboats on Western waters, of the advantages of which he appeared to have formed the greatest expectations; further, about the year 1786–87 or 1788 Fitch informed him that he contemplated employing his steamboat on the lakes, and meant to construct it with two keels to answer as runners, and when the lakes should freeze over, he would raise his boat on the ice, and by a wheel on each side, with spikes in the rims to take hold of the ice, he calculated it would be

possible to run thirty miles an hour; also, that he meant to tow boats and other floats by steamboats.

1787.—Mr. Patrick Millar, in 1787, published in English and French an account of his naval experiments, illustrated with plates, copies of which were presented to every sovereign in Europe, to the American States, and to the Royal Societies in London and Edinburgh. In this work, speaking of the use of wheels as the moving power of vessels, he says, "I have reason to believe *that the power of the steam-engine may be applied to work the wheels so as to give them a quicker motion,* and consequently to increase that of the ship. In the course of the summer I intend to make the experiment," etc.

The same year Millar took out a patent for propelling boats by means of paddle-wheels turned by men. His vessel had a double deck, was sixty feet long, and had two wheels turned by two men each.

During the summer Mr. James Taylor proposed to Millar the application of a steam-engine to the wheels of his boat in place of the men, who were soon fatigued by the labor necessary to force the boat to any speed through the water. Dr. Brewster, speaking of the invention, says, "That this gentleman was the inventor of the steamboat in the strictest sense of the word I will not venture to affirm, but I have no hesitation in stating it as my decided opinion that he is more entitled to this distinction than any other individual who has been named." Dr. Brewster was not aware of the successful experiment of Fitch a year earlier.

1787.—The next and third boat propelled by steam within the waters of the United States was built this year, by James Rumsey, of Virginia, who had a long controversy with Fitch as to the priority of the application of steam as a moving power for vessels. Rumsey tried his boat at Shepherdstown, Virginia, on the 3d of December, 1787, and the success of his experiment is certified to by Major-General Horatio Gates, Rev. Robert Stubbs, and others. This boat was propelled by sucking in water at the bow and ejecting it at the stern. It moved at the rate of four miles an hour, but made only one trip, and probably did not go half a mile in distance.

1788.—As early as 1788, Nathan Read, a graduate of Harvard and a resident of Salem, Massachusetts, devoted himself to the purpose of applying steam-power to navigation. Having learned of the unsuccessful experiments of Rumsey on the Potomac, and Fitch upon the Delaware the year previous, and believing their failure was owing to their ill-constructed machinery and modes of propulsion, he sought to overcome the difficulty by the invention and combination of machinery of a different and more perfect kind. He believed this could be done by a modification of "Watt's" improved engine, also that the modes of propulsion used by Rumsey and Fitch—setting poles, oars, paddles, or the ejection of water from the stern of the boat—were awk-

ward and unsuitable. He succeeded in inventing a new boiler. This boiler was constructed of seventy-eight vertical tubes placed within it, and he called it the Multi-tubular boiler.

1791.—In 1791 he obtained a United States patent for this boiler, and for the improvement of the steam cylinder, and for "a practical mode of driving or impelling boats or vessels of any kind in the water or against the current, by means of the chain-wheel, a rowing-machine, constructed and operating upon the general principles of the chain-pump, and moved by the force of steam or any other power, in the same manner as the chain-pump is moved."

1789.—Read constructed in 1789 a boat to which he attached paddle-wheels to an axis extending across the gunwales of the boat, turned by a crank, and designed to be moved by his high-pressure engine, with the continuous rotative principle of Watt. By means of the crank worked by hand Read propelled himself with great rapidity across an arm of the sea (called Porter's River) in Danvers. Satisfied from his experiment that paddle-wheels would drive a boat with great ease and speed when turned by the power of a steam-engine and controlled by its steady rotative principle, he determined to use *paddle-wheels*, and constructed a model of his steamboat accordingly, with a view to a patent. January, 1790, a committee of the American Academy of Arts and Sciences, and eleven of the most prominent citizens of Salem, certified to the importance of his improvements to the steam-engine.

1790.—He petitioned Congress February 8, 1790, to grant him a patent for his inventions, specifying he had "discovered an improved method of applying the power of steam to the purposes of navigation," and "The machinery for communicating motion to boats, vessels, etc., is very simple and takes up but little room." No patent laws or regulations had been established or patents granted by the general government, but soon after his petition to Congress the "Act to promote the progress of the useful arts" was passed, constituting the Secretaries of State and War and the Attorney-General a board of commissioners, to whom all matters of this character were to be referred, and his application came before the new board. He first asked for a patent for a boat consisting of paddle-wheels, his newly invented boiler and improved cylinder, but in looking over some of the old volumes of "The Transactions of the Royal Society," he chanced to notice an article relating to an experiment a long time previous in France, which related that paddle-wheels and oars had both been tried to control a ship of war in a calm. Erroneously supposing such an experiment interfered with his right to a patent for a boat with paddle-wheels, he withdrew so much of his petition as related to them, and, January 1, 1791, presented a new petition and substituted a new propelling agent, which he denominated a rowing-machine, to revolve like a chain-pump, which he believed would answer the next best purpose

to paddle-wheels, which he still considered preferable. As Fulton obtained his patent for paddle-wheels in 1811, Read was surely entitled to a patent for similar wheels in 1791. The paddle-wheel had been rejected by Fitch and Perrier principally on account of the oblique resistance the paddles met with as they entered and emerged from the water, and which was greatly increased as the boat was laden.

To obviate this Read constructed his wheels to be raised or lowered as occasion might require.

The first patents issued under the authority of the United States were to Read, Fitch, Rumsey, and Stevens, under date August 26, 1791. Read's was for his portable-furnace tubular boiler; Fitch's, for applying steam to draw water in at the bow and force it out at the stern of a vessel; Rumsey's, for propelling boats by means of the reaction of a stream of water forced by the agency of steam through a cylinder parallel to the keel, out of the stern. Stevens's was for propelling his boat in a like way. The patents of Rumsey, Fitch, and Stevens clashed in several particulars, but neither interfered with the patent of Read.[7]

1788.—In 1788, Rumsey carried his invention to England and procured a patent for it. He then succeeded in inducing a wealthy American merchant to join him, and began building a steamboat. It was all but completed when Rumsey suddenly died. His partners got the vessel afloat in February, 1793, and sailed her many times on the Thames, against wind and tide, with a speed of four knots an hour.

The thought of drawing water in at the bow and pushing it out at the stern was not new, and it has been said to have originated with Dr. Franklin, or to have come originally from France. Mr. Arthur Donaldson proposed it, also, to the Assembly of Pennsylvania in 1776.

Rumsey published in 1788 a pamphlet entitled "A Short Treatise on the Application of Steam; whereby is clearly shown from *actual experiments* that steam may be applied to propel boats or vessels of any burden, against rapid currents, with velocity, etc. By James Rumsey, of Berkeley County, Virginia. Philadelphia, printed by Joseph James, Chestnut Street, 1788."

The Newport *Herald*, dated March 6, 1788, contains the following item: "Mr. Rumsey's steamboat, with more than half her loading (upwards of three tons) and a number of people on board, made a progress of *four miles in an hour against the current of Potomac River by the force of steam, without any external application whatever*, impelled by a machine that will not cost more than twenty guineas for a

[7] Nathan Read was born in 1759, and died in Belfast, Maine, January 20, 1849, in his ninetieth year. So he lived full ten years after the successful inauguration of ocean steam navigation. See Nathan Read, etc., by his friend and nephew, David Read, New York, Hurd & Houghton, 1870, 12mo, pp. xv. and 20.

ten-ton boat, and that will not consume more than four bushels of coal in twelve hours."

1788.—The *fourth* steamboat in the United States was built in 1788, by John Fitch, and proved eminently successful. This boat was sixty feet long, and had eight feet beam. The oars or paddles were placed at the *stern*, and pushed against the water. The engine had a twelve-inch cylinder. About the end of July, 1788, she was propelled by steam from Philadelphia to Burlington, some twenty miles, *being the longest trip ever made by any boat under steam up to that time.* On the 12th of October this boat took thirty passengers from Philadelphia to Burlington in three hours and ten minutes, a fact well authenticated by reliable certificates. Several other trips were made in 1788 and 1789.

Dr. Franklin writes to Dr. Ingenhauz, Philadelphia, October 24, 1788: "We have no philosophical news here at present, except that a boat moved by a steam-engine rows itself against tide in our river, and it is apprehended the construction may be so simplified and improved as to become generally useful."

1788.—About the middle of October, 1788, a boat, the joint production of Patrick Millar, James Taylor, and William Symington, propelled by steam, was put in motion on the Lake of Dalswinton, in Scotland. A successful and beautiful experiment. The vessel moved delightfully, and, notwithstanding the cylinders were only four inches in diameter, went at the rate of five miles an hour. The engine, in a strong oak frame, was placed in a pleasure-boat, the boiler being parallel to it on the opposite side of the vessel, and the paddles in the *centre* of the boat. The vessel continued to ply for some days for the amusement of the projector, and to the astonishment of the country people, who assembled from all quarters to see a boat driven by *reik* (smoke). After these experiments the engine was removed into the library of Dalswinton House, where it stood for a long time as an ornamental model. In 1870 it was on exhibition in London, and an engraving of it was published in the London *Illustrated News.*

Satisfactory as was the result of this experiment, it did not fulfill all the designs of the inventors. A model vessel even as large as theirs might succeed and still leave it doubtful whether a larger scale might not impair the efficiency of the contrivance. Their success determined them to make an expensive trial on a large scale. From this determination resulted their second steamboat, constructed in 1789.

1789.—The date of commencing this vessel is fixed by the following letter, the original of which is preserved in the Millar family:

"DUMFERLINE, 6th of June, 1789.

"GENTLEMEN,—The bearer, Mr. William Symington, is employed by me to erect a steam-engine for a double vessel, which he proposes to

have made at Carron. I have therefore to beg that you will order the engine to be made according to his directions. As it is of importance that the experiment should be made soon, I beg also that you will assist him, by your orders to the proper workmen, in having it done expeditiously. I am ever, with great regard, gentlemen, your most obedient humble servant,

"PATRICK MILLAR.

"TO THE CARRON COMPANY, CARRON."

It was proposed to make the second experiment on the Forth or Clyde Canal. For this purpose Mr. Millar's large twin or double pleasure-boat, the same he had previously used with paddle-wheels, driven by men, was sent up from Leith to the Forth and Clyde Canal, at Grangemouth, on the Frith of Forth, to receive the new steam-engine.

This double or twin vessel was sixty feet in length, and had cylinders to her engines of eighteen inches diameter. Her engine was in all respects a larger machine than the first, but identical in construction, and of about twelve horse-power. At the first trial the boards of the paddle-wheels were broken by the concussion of the engine, which rendered the experiment incomplete, but on the 26th of December, 1789, the experiment was repeated, and the vessel propelled at the rate of *seven* knots an hour. The next day the voyage was repeated with the same success. The vessel being a light skiff with plank less than an inch thick, as soon as the experiments were over was replaced on her original station as a pleasure-boat, and the engine deposited at the Carron Works.

The following account of this experiment, drawn up by Lord Cullen, was published in three of the Edinburgh newspapers: "It is with great pleasure I inform you that the experiment which some time ago was made upon the Great Canal here by Mr. Millar, of Dalswinton, for ascertaining the power of the steam-engine when applied to sailing, has lately been repeated with great success. Although these experiments have been conducted under a variety of disadvantages, as having been made with a vessel built for a different purpose, yet the velocity acquired was no less than six and a half to seven miles an hour.

"This sufficiently shows that with vessels properly constructed a velocity of eight or nine, or even ten, miles an hour may be easily accomplished, and the advantages of so great a velocity in rivers, straits, etc., and in cases of emergency, will be sufficiently evident, as there can be few winds, tides, or currents which can easily impede or resist it, and it will be evident that even with slower motion the utmost advantage must result to inland navigation."

1790.—John Fitch, June 22, 1790, petitioned the Secretaries of State and War, and the Attorney-General of the United States, that

in the year 1785 he conceived the idea of applying steam to propel vessels through the water; that the impossibility of procuring experienced workmen and his total ignorance of the construction of a steam-engine, etc., caused him to expend about eight thousand dollars in experiments; that having at length *fully succeeded*, he comes forward as a man who, contrary to popular expectation, has *really* accomplished a design which will evince the many important advantages which must result to the United States.

He adds to his petition:

"The introduction of a complete steam-engine formed upon the newest and best principles, into a country like America, where labor is high, would entitle him to public countenance by encouragement independent of its use in navigation; the great time and money he has expended in bringing his scheme to perfection have been occasioned by his ignorance of the improved state of the steam-engine, for not a person could be found who was acquainted with the minutia of Bolton & Watt's new engine.

"And *whether your petitioner's engine is similar or not to those in England he is this moment totally ignorant;* but is happy to say, that he is now able to make a complete steam-engine which in its effects, he believes, is equal to the best in Europe; the construction of which he has never kept secret.

"On his first undertaking the scheme he knew there were a great number of ways of applying the power of steam to the propelling of vessels through the water, perhaps all equally effective, but this formed no part of his consideration, knowing that if he could bring his steam-engine to work *in a boat*, he would be under no difficulty in applying its force; therefore he trusts no interference with him in propelling boats by steam, under any pretense of a different mode of application, will be permitted; for should that be the case, the employment of his time and the amazing expense attending the perfecting of his scheme would, while they gave the world a valuable discovery, and to America peculiar and important advantages, 'eventuate in the ruin of your petitioner; for a thousand different modes may be applied by subsequent navigators,' all benefited by the expense and persevering labor of your petitioner, and then sharing with him those profits which they never earned."

1789–90.—The *fourth* steamboat built in the United States not being considered fast enough, the steamboat company which had acquired an interest in John Fitch's invention built a *fifth*, which was first tried December, 1789, about the time Millar was making his second successful experiment in Scotland. Her speed not proving satisfactory, various alterations were made in her machinery, until April, 1790, when the most complete success was attained. In May, General Mifflin and the whole Supreme Executive Council of Penn-

sylvania were passengers in her. The following account of this experiment is given by William Thornton, Esq., who was one of the company interested, and a passenger on board:

"The day was appointed, and the experiment made in the following manner. A mile was measured in Front Street (or Water Street) Philadelphia, and the bound projected at right angles as exact as could be to the wharves, where a flag was placed at each end, and also a stop-watch. The boat was ordered under way at dead-water, or when the tide was found to be without movement; as the boat passed one flag it was struck, and at the same instant the watches were set off; as the boat reached the other flag it was also struck and the watches instantly stopped. Every precaution was taken before witnesses, the time was shown to all, the experiment declared to be fairly made, and the boat was found to go at the rate of eight miles an hour, or one mile within the eighth of an hour. The Governor and Council of Pennsylvania were so highly gratified that, without their intentions being previously known, Governor Mifflin, attended by the Council in procession, presented to the company, and placed in the boat, a superb silk flag, prepared expressly, which Mr. Fitch afterwards took to France and presented to the National Convention."

They were thus particular in ascertaining the exact speed of the boat, as on her going at the rate of *eight miles an hour* depended the assignment of her in shares to a company. It seems to be a little uncertain whether the silk flag presented contained the arms of Pennsylvania or was simply the flag of the United States.

The boat afterwards ran eighty miles in a day. She was placed upon the Delaware in the summer, and ran regularly as a packet, passenger, and freight boat for three or four months. Advertisements of her trips were published in the Philadelphia newspapers. Of these notices, twenty-three have been found, giving advice of thirty-one trips to Trenton, Burlington, Chester, Wilmington, and Gray's Ferry. One of these advertisements, taken from *The Federal Gazette and Philadelphia Daily Advertiser* of Monday, July 26, 1790, is as follows. It will be seen it *was thought* sufficiently distinctive to call her *the* steamboat, since there was none other in the world at that time:

"THE
STEAMBOAT

Sets out to morrow morning at ten o'clock, from Arch Street Ferry, in order to take passengers for Burlington, Bristol, Bordentown, and Trenton, and return next day.

PHILADELPHIA, July 26th, 1790."

It is estimated that during the summer this steamboat passed over between two and three thousand miles. In the autumn she was laid up and never used afterwards, there not being sufficient travel and transportation to pay the expense of running her.

Before this conclusion was arrived at the company had projected and commenced building another, intended for the navigation of the Mississippi, and called the "Perseverance." She was of twenty-five tons burden, and rigged schooner fashion. The boat was completed, and her engines nearly so, when she broke adrift from her fastenings at the wharf, in a storm, and was blown on shore at Petty's Island, in the Delaware. Before she could be gotten off, the company in their attempts to simplify the machine had ruined it, and, moreover, had got into debt, which obliged them to sacrifice both boats and all the machinery.

1790.—William Longstreet, an American inventor, born in New Jersey, and who died in 1814, removed to Georgia. In 1790 he wrote a letter to Thomas Tolfairs, of Savannah, asking him to assist him in raising means to construct a boat to be propelled by steam. This letter was published in the Savannah and Augusta, Georgia, newspapers, but the funds were not immediately obtained. He subsequently obtained the necessary means for experiment, and constructed a small model boat upon a plan very different from Fulton's, which went on the Savannah River against the stream five miles an hour.[8]

1790.—Earl Stanhope, May 7, 1790, patented a *Janus*-shaped vessel, which he styled an "Ambi-navigator," with a propeller in the form of a duck's foot, worked by a twelve-horse cross-head engine, with double connecting-rods. At the conclusion of the experiment it was laid up in Deptford Dock-Yard. This engine, at least such portion of it as could be made available, was in 1802 applied to the *first steam-dredge*, built for the Admiralty. The "Ambi-navigator" had a novel description of rudder, styled by the inventor an "equipollant rudder."

1791.—On the 26th of August, 1791, John Fitch obtained a United States patent for his invention, which is signed by George Washington, President, Thomas Jefferson, Secretary of State, who also certifies that the patent was delivered to him August 30. The patent recites "he having invented the following useful devices not before known or used, viz.: for applying the force of steam to a trunk or trunks for drawing water in at the bow of a boat or vessel, and forcing the same out at the stern, in order to propel the boat or vessel through the water, for forcing a column of air through a trunk or trunks filled with water by the force of steam, and for applying the force of steam to cranks, paddles, for propelling a boat or vessel through the water." The said John Fitch, his heirs, etc., were granted for the time of fourteen years the sole and exclusive right and liberty of making, using, and vending to others the said inventions.

At the request of Aaron Vail, Esq., the United States consul at L'Orient, John Fitch was sent in 1791 by the company to France for the purpose of building steamboats. A brevet of invention was granted

[8] Appleton's American Cyclopædia.

him on the 29th of November, 1791, for his invention, but in the "Description des Machines et Procédés specific dans les Brevets d'Inventions expires Paris, 1811," it is stated that Des Blancs had previously proposed a similar scheme, and that a model of his plan had been deposited in the "Conservatoire des Arts et Métiers."

Mr. Vail, unable to obtain workmen to build the boats, paid the expenses of Mr. Fitch, who returned to the United States. Mr. Vail afterwards subjected to the examination of Mr. Fulton, when in France, the papers and designs of the steamboat appertaining to the company.

Under date "Philadelphia, 29 June, 1792," Fitch wrote to David Rittenhouse, "I conceive that navigation by steam will be the second mode of navigation, but can never take the preference of a fair wind, as air is much cheaper than steam. It may also be boldly asserted that it would be much easier to carry a first-rate man-of-war by steam at an equal rate than a small boat; for in such a case we should not be so cramped for room, nor should we so sensibly feel a few pounds weight of machinery.

"This, sir, whether I bring it to perfection or not, will be the mode of crossing the Atlantic in time, for packets and armed vessels."

In his autobiography, Fitch uses this touching and prophetic language: "The day will come when some more powerful man will get fame and riches from MY invention; but nobody will believe that poor John Fitch can do anything worthy of attention."[9]

[9] JOHN FITCH.—The remains of John Fitch were interred in the village graveyard of Bardstown, Nelson County, Kentucky, in the rear of the court-house and county jail, in 1798. Not a pebble of all the fine stone in the land marks his last resting-place. But his last will and testament is on record, as copied by a correspondent of the Philadelphia *Evening Telegraph*,—viz.:

"I John Fitch of the County of Nelson do make this my last will and testament. To William Rowan Esq., my trusty friend my beaver hat shoe knee and stock buckles walking stick, and spectacles. To Doctor William Thornton of the City of Washington in District of Columbia. To Eliza Vail, daughter of Aaron Vail Consul of the United States at L'Orient. To John Rowan Esq. of Beards Town son of said William and to James Nourse of said town I bequeath all the rest of my estate real and personal to be divided amongst them share and share alike and I appoint the said John Rowan Esq. and James Nourse Esq: my executors and the legacies hereby bequeathed to them my said Executors is in consideration of their accepting the Executorship and bringing to a final close all suits at law and attending to the business of the estate hereby bequeathed. Hereby declaring this to be my last will and testament this the 20th day of June One Thousand Seven Hundred and ninety-eight—Witness my hand and seal,

"JOHN FITCH.

"Acknowledged, signed and sealed in presence of

"JAMES NOURSE

"MICHAEL RENCH

Her

"SUSANNAH × McCOWN"

mark

On the 10th of July following the will was proved by the executors, and ordered to be recorded.

1791.—Colonel John C. Stevens, of Hoboken, New Jersey, commenced his experiments in steam navigation in 1791, and by careful study succeeded in mastering the theory and practice of the steam-engine. With this knowledge as a basis he made further investigations, which resulted in inventions, the first practical tests of which proved so satisfactory that he at once set about developing his ideas in order to devote them to the public good. His first attempts were made with a rotatory engine, for which he substituted one of Watt's. His first engineer proved an incorrigible sot. His second became a consumptive, and died before his experiment was completed. He then resolved to depend upon his own resources, and built a workshop on his own estate, where he employed workmen under his own superintendence. It has been claimed that he invented the first tubular boiler about 1804, but Nathan Read took out a patent for one in 1790. With various forms of vessels and different modifications of propelling apparatus, he impelled boats at the rate of five or six miles per hour. They were in truth more perfect than any of his predecessors, but did not satisfy his own hopes and sanguine expectations.

1792.—Baron Seguier experimented with a submerged propeller.

1792.—The Historical Chronicle of the *Bee*, page 23, says, "Earl Stanhope's experiments for navigating vessels by the steam-engine, without masts or sails, have succeeded so much to his satisfaction on a small scale, that a vessel of two hundred tons burden on this principle is now building under his direction. The expense of this vessel is to be paid by the Navy Board in the first instance, on condition that if she do not answer after the first trial, she shall be returned to Earl Stanhope, and all the expense made good by him."

A similar account of the earl's steam-vessel appeared in the *Gentlemen's Magazine* for October, 1792 (page 956), where it is stated that it was then being built under his direction by Mr. Stalkart, the author of a very valuable work on naval architecture. About this time Robert Fulton, then living at Torbay, in Devonshire, held some correspondence with Earl Stanhope on the subject of moving ships by a steam-engine.

1793.—The Earl of Stanhope, in 1793, revived the project of Genevois, and this machine, in 1795, was placed in a boat furnished with a powerful engine, and tried by him in Greenland Dock. In this experiment the paddles were two gigantic duck's feet, suspended from either side of the vessel, and opening and shutting like huge umbrellas. He was unable to obtain for his boat a greater velocity than three miles an hour. While engaged in this experiment he received a letter from Robert Fulton, who proposed the use of paddle-wheels; and it is probable his neglect to listen to this suggestion caused a delay in the introduction of the steamboat of at least twelve years, for it cannot be doubted that the ingenuity of Fulton, backed by the wealth and influ-

ence of Lord Stanhope, would have been as successful then as it was years later.

It is not known at what date Fulton's intention was first directed to the application of steam to navigation, but among the papers of Mr. Fulton, after his death, was found a letter from the Earl of Stanhope, dated at Holdsworth, Devon, October 7, 1793, in which he says,—

"SIR,—I have received yours of the 30th of September, in which you propose to communicate to me the principles of an invention which you say you have discovered respecting the moving of ships by the means of steam. It is a subject on which I have made important discoveries. I shall be glad to receive the communication which you intend, as I have made the principles of mechanics my particular study," etc.

In 1792 or 1794, Elijah Ormsbee, a carpenter by trade and inventor by birth, and a native of Connecticut, is said to have moved a boat successfully by steam. He had noted the difficulties of navigation on the Hudson River, and when afterwards he saw steam used as a power for pumping water from mines, saw how those difficulties could be overcome. One day, David Wilkinson, of Pawtucket, another inventor, stopped at Cranston, Rhode Island, where Ormsbee was at work, when Ormsbee said he had been thinking about a steamboat, and added if Mr. Wilkinson would make the castings he would make the boat; to which Mr. Wilkinson agreed, and went home and cast and bored a cylinder, and made the necessary wrought-iron connections. Two kinds of paddles were proposed, one called a flutter-wheel (a side-wheel), the other termed a goose-foot, which they decided to try, as the power could be applied more cheaply. Mr. Ormsbee obtained from Messrs. Clark & Nightengale the loan of a long boat belonging to the ship "Abigail" for the experiment, and also borrowed from Captain Ephraim Bowen a copper still of about one hundred and fifty gallons capacity, and retreated to a place called Windsor Cave, where all of the wood and much of the iron-work was done by himself. At last one pleasant afternoon or evening in the autumn of 1792 he got into his boat, pulled the throttle-valve, and the boat glided out into the bay. He was yet fearful that his new-found power might fail him, and so sat silent and eager, watching the piston rise and fall and the paddles go to and fro. But it did not fail; the boat went steadily through the water, and arrived at Long Wharf in Providence. The next day Mr. Ormsbee left in the boat for Pawtucket to show Mr. Wilkinson the success which had attended his enterprise. After a day or two the boat came back to Providence, where it was received with astonishment. For several weeks the boat went up and down the river; Captain John H. Ormsbee, then a lad of twelve, going in her as steersman.

The steam was not applied to elevate and depress the piston, as was done by Watt, but applied to raise the piston, and then being condensed by cold water, the piston was turned by atmospheric pressure. In this way the goose-foot paddles of the boat were moved forward and aft. When they moved forward they closed, and when moved aft they expanded to a width of from eighteen to twenty-four inches. The progress of the boat was from three to four miles an hour, which would probably have been increased to five or six if wheels had been substituted for paddles. But Ormsbee had no Livingston with open purse to assist him, and so, after having demonstrated the possibility of steam navigation, his golden dreams faded, and he sorrowfully returned the still to the distillery and the boat to its owner.

When, in 1817, the "Firefly" arrived in Pawtucket, people remembered the steam long-boat, and said, "We have seen a boat go by steam before;" and Colonel John S. Eddy a few years since related that when fourteen years old he went with his father to Kettle Point and "saw Mr. Ormsbee in a canoe with a kettle in it raising steam to propel a boat." This was in 1794. He did not build it on Kettle Point, but went down there to get out of sight of people. He worked first on a canoe dug out of a log, and afterwards applied steam to a long-boat. He used to talk a great deal when steamboats first came into use about Elijah Ormsbee's getting up such a thing a great while before. Mr. Henry H. Ormsbee, of Providence, has a statement in the handwriting of his father, Captain John H. Ormsbee, in accordance with this statement, and there is corroborative evidence on record in the files of the Transactions of the Society for the Encouragement of Domestic Industry. It was stated by Mr. Wilkinson, who took the works after the boat was abandoned, that he exhibited and explained them to one Daniel French, who in turn made Robert Fulton acquainted with them.[10]

1793.—John Smith, in June, 1793, used a steamboat with paddle-wheels on the Duke of Bridgewater Canal, from Runcorn to Manchester. The vessel had on her an engine on the old atmospheric principle, was worked with a beam, connecting-rod, double cranks, in a horizontal line, with seven paddles on each side, which propelled her after the rates of two miles an hour.[11]

1794.—In 1794, Lord Stanhope addressed a letter to Wilberforce on the question of peace or war, likely, he thought, to be brought under discussion on the meeting of Parliament. In his letter he speculates on the possible resources of France, and hints that England is not invulnerable. He says,—

"This country, Great Britain, is vulnerable in so many ways, the

[10] History of Steam Navigation between Providence and New York, 1792–1877, by Charles H. Dow.

[11] *Nautical Magazine*, vol. i., 1832.

picture is horrid. By my letter I will say nothing on that subject. One instance I will, however, state, because it is information you cannot, as yet, receive from any other quarter; though in two or three months from the date of this letter the fact will be fully established, and you may then hear it from others. The thing I allude to is of peculiar importance. The fact is this. I know (and in a few weeks shall prove) that ships of any size, and for certain reasons the larger the better, may be navigated in any narrow or other sea without sails (though occasionally with), but so as to go without wind, and even directly against both wind and waves. The consequences I draw are as follows: First, that all the principal reasons against the French having the ports of Ostend, etc., cease, inasmuch as a French fleet composed of ships of the above-mentioned description would come out at all times from Cherbourg, Dunkirk, etc., as well as from Ostend, etc., and appear in the same seas. The water, even at Dunkirk, will be amply deep enough for the purpose of having them there. The French having Ostend, ought not, therefore, under this new revolution in naval affairs,—for it would be a complete revolution,—to be a bar to peace. Under the old nautical system, naval men might have reasoned differently upon that subject. But the most important consequence which I draw from this stupendous fact mentioned at the top of this page is this, namely, that *it will shortly render all the existing navies of the world* (*I mean military navies*) *no better than lumber.* For what can ships do that are dependent upon the wind and weather against fleets wholly independent of either? Therefore the boasted superiority of the English navy is no more. We must have a new one. The French and other nations will, for the same reasons, have their new ones."

This is a curious prediction as to the effect of the introduction of steam to navigation upon naval warfare and armaments, written, as the Earl's letter was, full thirteen years before Fulton's success with the "Clermont" on the Hudson.

1794.—William Lyttleton, July 15, 1794, took out a patent in England for a screw propeller of three blades, which was to be rotated by hand-power or a steam-engine, and experimented with a copper screw so formed as described by Colonel Beaufry.

The same year Samuel Morey, of Connecticut, who commenced his experiments on the Connecticut River in 1790, propelled his boat by a stern wheel from Hartford to New York City, at the rate of five miles an hour. Chancellor Livingston, Judge Livingston, Edward Livingston, John Stevens, and others, were on board this boat when she went from New York to Greenwich. This was the *sixth* steamboat built in the United States.

The most reliable account of Morey's experiments and claim to having made the first application of steam to navigation, and of having made the "first practical steamboat," was published in 1864, by the

Rev. Cyrus Mann, of Orford, New Hampshire. Mr. Mann, an educated man, of strict integrity, spent both time and research in the investigation of the claims of Fulton, Morey, and others, of a practical success in steam navigation. The following is an extract from his book:

"The credit of the invention of the steamboat is commonly awarded to Robert Fulton, but it belongs primarily and chiefly, it is believed, to a more obscure individual. So far as is known, the first steamboat ever seen on the waters of America was invented by Captain Samuel Morey, of Orford, New Hampshire. The astonishing sight of this man ascending Connecticut River, between Orford and Fairlee, in a little boat just large enough to contain himself and the rude machinery connected with the steam-boilers and a handful of wood for a fire, was witnessed by the writer in his boyhood, and by others who yet survive.[12] This was as early as 1793 or earlier, and before Fulton's name had been mentioned in connection with steam navigation."

The records of the Patent Office at Washington show that several patents for the *application of steam* were taken out by Morey for the application of steam "to boats" previous to Fulton's, as Morey's great aim had always been to invent a steamboat.

Captain Samuel Morey, a son of General Israel Morey, who moved to Orford from Connecticut in 1766, died in 1843, aged seventy-one years. He originally owned fifteen hundred acres of woodland about Fairlee Pond, and employed a large number of men and oxen during the winter months in clearing the lumber for market, the proceeds of which, forty thousand dollars, were consumed in scientific projects. He began in 1780 to give attention to subjects of light, heat, and steam, and invented several ingenious contrivances. He was a correspondent of Professor Silliman, and contributed to the pages of the *American Journal of Science and Arts*. He also corresponded with Fulton, and visited him twice in New York, and exhibited to him the model of his boat, receiving a return visit from Fulton.

After visiting Morey, Fulton commenced his boat on the Hudson, and Morey always held that he surreptitiously imitated his model. In 1820, Morey put on Fairlee Pond a boat named the "Aunt Sally." It was twenty feet long, and neatly painted. Some unprincipled person sunk it soon after its trial trip, and it now rests beneath the waters of the pond.

Writing to William A. Duer, Esq., October 31, 1818, Morey says, "As near as I can recollect it was as early as 1790 that I turned my attention to improving the steam-engine and in applying it to the purpose of propelling boats. . . . In June, 1797, I went to Bordentown, on the Delaware, and there constructed a steamboat, and devised

[12] Mrs. Nathaniel Mann was on board the steamboat of Morey, and "ordered it," as she said.

the plan of propelling by means of wheels, one on each side. The shafts ran across the boat with a crank in the middle, worked from the beam of the engine with a shackle bar. . . . The boat was openly exhibited in Philadelphia. . . . I took out patents for my improvements. . . . I never had any doubt but that I had a right to take out a patent for the application of two wheels to a steamboat, and often told Mr. Livingston and Mr. Fulton that I had. To the latter, I once asserted this right when on board his steamboat with him." Nothing but want of pecuniary means, as he asserted, seems to have been wanting for his inaugurating his methods of propelling boats by steam.

Morey's claim as the inventor of the first successful steamboat must give way before the superior claims of Fitch's steamboat already recounted, however.

Captain Morey continued his scientific pursuits to the time of his decease, and they were more or less honored and recognized, but he never recovered from the blow received through the alleged perfidy of Fulton.

GEORGE H. PREBLE,
Rear-Admiral U.S.N.

(To be continued.)

THE SOLDIER'S AID SOCIETY.

I.

"And with velvet pansies, around like a bower,
The maiden found her mystic flower;
Now, gentle flower, I pray thee tell
If my lover loves me, and loves me well."

MR. BRAYTON'S house was a large double mansion, white, with green blinds; it was set a little ways back from the street, and upon each side of the straight path, leading from the gate to the door, were broad flower-beds filled with plants of every variety. These beds were bordered with a narrow edge of box, and the whole establishment bore the air of old-time New England aristocracy. On this particular afternoon the front door, with its serpent knocker of brass, stood wide open, as if to welcome the ladies of the village who were going *en masse* to attend the Soldier's Aid Society.

Jennie Parker, the belle of the town, with her pink cheeks and golden hair, was walking rapidly down Front Street, arm in arm with her friend Lillie Watson, from Philadelphia, who was disclosing a wonderful scheme that some of the girls whom she knew had tried to interest the soldiers and themselves.

"You see, Jennie," she said, "Hettie made six pairs of mittens for our box last winter, and in every one she put a note, and, would you really believe it, she had five answers."

"Why, Lillie," exclaimed her friend, "did she sign her real name to them?"

"Certainly she did, and I think some of her notes must have been very silly, for she is a great flirt and I never liked her; but any way, after that ever so many tried it."

"It would be splendid!" said Jennie. "I'll tell them this afternoon about it. But did you try it, Lillie, and did you get a letter?"

Lillie blushed and tossed her head, but after some coaxing displayed a brass button, which she had made into a pin and wore at her neck, saying, however, that she would tell nothing more until that night.

As they neared the house Lillie asked, "Who is this Miss Brayton whose house we are going to?"

"Oh, she is an old maid, but her father is the wealthiest man in

town, and she started the 'Soldier's Aid' here; she runs all the guilds and such things, and she does have the loveliest flowers, especially pansies; she has every variety, and they are in blossom all the year round. People say she had a love-affair years ago and gave up a splendid man, Mr. Carleton, simply because he was an atheist."

"How very silly she must be! I suppose she would be too priggish to put notes in any of the things?" asked Lillie.

"Oh, dear, yes, she is too old for romance; she must be thirty-five if she is a day," exclaimed the pretty seventeen-year-old maiden.

The prim New England matrons looked aghast at the idea of notes being sent about promiscuously with their daughters' names attached, but the girls tossed their heads and looked defiant. The Saturday following was appointed for the packing of the barrels, and the ladies chosen for the work were Miss Helena Brayton, Mrs. Martin, and Jennie Parker, whose friend Lillie offered to assist.

That night, when Helena Brayton went to her room, she unlocked a small writing-desk, and taking out a case which contained an ambrotype of Ferdinand Carleton, looked long and earnestly at it. Then taking out a package of letters, she sat down by her table and read for some time. One envelope contained a bunch of faded pansies, tied with a violet ribbon. "I never cease to think of him," she said, musingly; and the remembrance of their last interview rose up before her. "It would be worse than foolish for me to write any note and put with that dressing-gown," she thought, as her eyes turned to a gray robe which lay on her lounge, and which she had just finished. "I would not want any one but him to get the note," she murmured, "and yet I certainly don't want him to be wounded and laid up in the hospital; but all the time it has seemed as if I were making that robe for him. I had the quilted satin of blue just because I knew he would like it. But it is not likely that he would get either the dressing-gown or the note, and perhaps he has forgotten me any way."

She laid her arms upon the table, and resting her head upon them, thought and thought. Ah! no one knew what those twelve long years had been to Helena. Always bright and cheerful before her father and friends, faithful in her church-work and social relations, but always taking as retired a position as possible, none could have imagined the intensity of the hidden sorrow of her heart. She had acted from principle in breaking off her engagement with Ferdinand after his views towards Christianity had become so *outrè*. And yet how often the agonizing thought presented itself that possibly she had done wrong, and that if she had married him she might have influenced him to better things.

Before the articles made by the Soldier's Aid were packed, Helena had placed in the breast-pocket of the dressing-gown, which she had made with such care, an envelope containing a sonnet she had com-

posed and a few large, fresh, purple pansies, carefully pressed and tied with violet ribbon. "The pansy was his favorite flower," she murmured. She blamed herself for the wild idea that Colonel Carleton would ever wear her dressing-gown, or if he did that he would know that she sent it, for she had signed no name or initials, merely dating the paper, and putting the name of her village at the close of the lines she had written. The next week the barrels were on their way to Washington.

The hollyhocks withered, the asters and marigolds hung their frosted heads, and the flower-beds looked deserted, for autumn was hastening on with rapid steps towards winter, and still the cruel war continued, and Helena Brayton heard nothing of the fate of the dressing-gown.

II.

"By all those token flowers that tell
What words can ne'er express so well."

A few nights after the battle of Bull Run, Ferdinand Carleton and his partner were sitting in his bachelor apartments talking over the alarming condition of the country. Both were smoking, and Carleton held in his hand the *New York Times*.

"Then your mind is made up positively to enlist, is it?" asked Mr. Sedgwick.

"Oh, yes; I want to go; life isn't any too interesting for me to be afraid to risk losing it."

"That is absurd, Carleton; a fellow with your position and talents can make life answer all his desires. You could get almost any of the girls in New York; and you ought to be married any way. Mrs. Sedgwick says so; she says you are just the man to make any girl happy."

"Oh, I'm a confirmed old bachelor. I'll be forty before long if I don't get killed in the war."

"That's just it; you have no time to lose, and ought to see about making some girl happy right away."

Carleton laughed rather bitterly, and then as Mr. Sedgwick rose to go he rose also, saying he would go part way and then drop in at the club and have a game of billiards. As they passed a flower-stand Carleton stopped, and buying a bunch of roses, he asked Mr. Sedgwick to take them to his wife and thank her for her good opinion of him, but to tell her that he was incorrigible; and then selecting for himself a few rich purple pansies, he fastened them in his button-hole, and bidding his partner good-night, he went into the club. He sat up late that night smoking and thinking, not of the present nor the future, but of the past: and as he handled the now withered pansies, he thought of

a sweet young girl with pansies in her hair and at her belt, and he seemed to see her pinning one on his coat. The next week he joined the Seventh Regiment. Fortune favors the brave, and at the time our story opens he had become Colonel Carleton.

Helena Brayton had seen the promotion mentioned in the Boston papers, and the news had thrilled her with love; but she thought that the sensation she experienced was merely a high order of patriotism.

One night after a fearful battle Colonel Carleton was bending over a dying comrade who lay bleeding on the battle-field, and was doing all in his power to alleviate his friend's suffering, hoping each moment that an ambulance would come to convey him to some place of shelter.

"Is there anything more, Hal, that I can do for you?" he asked.

"Oh, colonel, if you could say some prayer for me; my wife's prayer-book was in my knapsack, but I don't know where it is now; but you can say one, for it's growing so dark and——"

The hot blood mounted to the colonel's forehead. What prayers did he know? He had not entered a church since he went the last time with Helena, and had ridiculed the service and pained her tender and devout heart. What should he do? He dared not, in the presence of the angel Death, tell this poor fellow that prayer was useless, as he had believed for years. He now saw by a strange, inward light that his own life had been one great mistake, and that he himself had lived and believed a lie for years.

There is such a thing as feeling truth; Colonel Carleton felt it that night; he felt an invisible presence about him; he felt that God was Truth, and that the Truth was God; and that unbelief, agnosticism, and atheism were the weapons of the Prince of Darkness.

"Say just one, colonel; it is so cold and dark," gasped the dying soldier; and in the silence that followed his last request his soul was called home, while the full moon shone down upon Ferdinand Carleton kneeling by a dead body.

Helena Brayton's twelve years of prayer for him were beginning to find their fulfillment.

III.

"There's a sweeter flower than e'er
Blushed on the rosy spray,—
A brighter star, a richer bloom
Than e'er did western heaven illume
At close of summer day.
'Tis Love, the last, best gift of heaven;
Love gentle, holy, pure."

Mrs. Pomroy, the head nurse of the Union Hotel Hospital at Georgetown, resolved that the very best of care must be given to Colonel Carleton for several reasons: in the first place he was very

severely wounded and needed extra attention; then he was a favorite colonel and had distinguished himself in several recent battles, and, moreover, Mrs. Pomroy had known him in New York before the war, and he had been the last one to minister to her dear brother Hal, who died on the battle-field. All these reasons prompted her to feel great interest in him, although she would not have neglected any other patient for him who needed her.

"When do you suppose I can sit up, Mrs. Pomroy?" asked the colonel one day; "it seems as if I had been lying here forever."

"Very likely you can to-morrow, colonel; and a box of goods were sent us from Washington to-day, and I have selected a love of a dressing-gown from it for you. Would you not like to see it?" she asked, hoping it would rouse his interest.

"Yes, I believe I would," he said, slowly. "I did not suppose you would let me sit up this week."

Mrs. Pomroy went to the store-room, and returned with a package done up in soft tissue-paper and laid it upon the bed.

"Now I must leave you," she said, pleasantly, "and you can admire it until you fall asleep."

As Colonel Carleton feebly unwrapped the tissue-paper a delicate perfume was perceptible, and a strange thrill seemed to run through his heart. "She always used such faint, dainty perfumes," he thought. As he removed the last wrapping he exclaimed, "It is just like the one she saw me have on that morning when her father was so ill and she was so worried."

Involuntarily he slipped his hand into the inner breast-pocket and drew out an envelope, directed in the handwriting he used to know so well,—"For a wounded soldier." Trembling, he broke the seal, and taking out the letter unfolded it; as he did so there dropped out three purple pansies; on the violet ribbon with which they were tied was inscribed with gold letters the meaning of the word pansy,—"*Pensez à moi.*"

The tears sprung to his eyes, for he was weak and ill, and the emotions are not under control at such times. He pressed the pansies to his lips, and then smoothing out the sheet of paper, read the following lines:

"FIGHT THE GOOD FIGHT OF FAITH."

The world may well be called a battle-field,
  And life is one great strife to win a crown;
  But not the hope of fickle earth's renown
Inspires true heroes not to faint nor yield
E'en if the foe a mighty weapon wield;
  For heavenly music can earth's war-cries drown,
  Or change to smiles the tyrant's cruel frown.
And he, who at the Throne of Grace hath kneeled

To learn the secrets of Eternal Love,
Cares not to win a diadem of gold,
But like a loyal soldier, brave and true,
Obeys the Captain's orders from above,
And armed with Faith and Truth may well be bold,
For when the campaign's o'er the Crown is sure.

DEERING, September 18.

"Why, colonel, what makes your pulse so rapid to-night? and what's the meaning of all this fever? Indeed I cannot let you sit up to-morrow," said the surgeon as he stopped on his evening rounds.

"Oh, but I really feel better, doctor," said the colonel, "and I am very anxious to begin to sit up."

"Well, well, we'll see," said the surgeon.

"I want to send a dispatch to-night, doctor; if I write it now will you take it?" asked the patient.

"Certainly; but you had better let me write it for you, colonel."

"Oh, no; let me try."

"Well, here is paper and pencil; but I think that arm is too weak; if you can't do it, I will."

The physician thought to himself that there certainly was a lady in the case, and if so, that would account for the excited condition of his patient.

The next morning when Mr. Brayton and his daughter were sitting at the breakfast-table, a servant brought in a telegram directed to "Miss Helena Brayton." It ran thus:

"UNION HOTEL HOSPITAL, GEORGETOWN, D. C.,
"November 10, 1862.

"The dressing-gown has come. I shall enlist under the banner of your Captain. Will you come and help me?

"FERDINAND CARLETON."

This accounts for the fact that the wedding of the sedate Helena Brayton took place in the dreary hospital at Georgetown.

CAROLINE FRANCES LITTLE.

NANTUCKET, MASS.

FRONTIER SERVICE IN THE FIFTIES.

(Concluded from Vol. X., page 545.)

THE sudden change of position of the Indians so much farther to our left than when they disappeared over the hill was nothing more nor less than a splendid piece of *strategy*. At the foot of the little hill they crossed at once a small shallow ravine, turned directly to the left, and made the best time possible up the ravine for this *knoll*, and formed, waited, and *rested*. Of course as soon as I saw them I changed my direction and went directly for them. The company was brought "front into line" and in single rank, the gallop being kept up all the time. The men were becoming impatient as we neared the Indians, and began to finger the butts of their revolvers, although I had as yet given no order to "draw pistol." I, too, was becoming anxious to have a disagreeable job over.

On approaching the bottom of the hill evidences of the ravine began plainly to show themselves, and it became necessary to slacken the gait in order not to run the chance of going headlong into difficulty. It took but a few seconds to see that we had approached the ravine at a point where it was impossible to cross it, and even had we been on foot it would have taken time and trouble. Every one hunted for a crossing, our foes coolly looking on at our efforts. It was soon discovered that it was necessary to go back, down the ravine, to find a place. The moment we found it the Indians started at a run for the timber and rocks. I had been completely outgeneraled; they had gained time and distance on me, and had rested their horses, and, finally, won the race to the timber and rocks at an easy gallop.

I followed up at a gallop, but when I dismounted "to fight on foot," at the edge of the timber, there was not an Indian to be seen. And in addition, it was impossible, on account of the nature of the ground, for the led-horses[1] to follow the skirmish line, nor would it have done to have them too far in the rear, to follow the skulking Indians, as, if my ships, as it were, had not been "burned behind me," they might have been *stolen;* and to have returned to the main command *on foot* would have raised a laugh, and gained for me the reputation of having done some very poor soldiering, and later, perhaps, a court-martial, all of which I would have deserved.

[1] One ridden and three led by every fourth man.

I remounted the company and returned, at a walk, over the same ground in order to take possession of the herd of sheep from which we had driven the Indians. I found there were about *six thousand* in the herd. They were fine, fat, and large.

I shortly discovered that soldiers were not good sheep-herders, as it seemed impossible to keep the sheep in compact order, and this became more necessary every moment, as the Indians on ponies were gathering about us from all directions, and very soon had a party quite as large as my own, and it was rapidly increasing in size.

We were obliged to move from side to side of the much scattered sheep herd, to meet the rapid change of position of the Indians, as they seemed determined to retake it if possible. I could see no signs in any direction of the other two companies, and matters began to look very serious, as I disliked very much even thinking of the possibility of losing the captured sheep; but to fight a party of Navajos larger than my own and herd sheep at the same time, and above all to reach water before dark, seemed to be a big job. However, without any apparent cause the Indians began to leave me and to quickly disappear from my vicinity. But on looking across the plains to the northwest, I could see the explanation for the sudden movement of the Indians in a big dust, which proved to be the approach of Colonel Miles with the infantry, pack-train, etc. It was a welcome sight to us, as it meant camp, and we were tired, dusty, hungry, and thirsty.

Soon after meeting Colonel Miles we encamped for the night, and got a drink of water not quite as hot as the little left in our canteens.

Just before dark the other two companies returned; they had had a hard chase after Indians with a herd of ponies, but failed to come up with them, on account of the fresh condition of the ponies, and the reverse on the part of the horses of the two companies. It had been a hard day for all of us, as we had been on the move from eight o'clock of the evening of one day until after five o'clock of the afternoon of the next, with hardly a moment's rest.

That night the men feasted, as they were given permission to kill and eat of the captured sheep until they were filled.

The Indians hovered about our camp, in full view, but at a safe distance, taking, without doubt, mental notes for future use, and also very likely getting *whiffs* of their own mutton-chops, of which, on this occasion, they were *not invited* to partake.

The camp soon settled down for the night, pickets were detailed and points selected for their stations, where they were accordingly posted after it became dark.

A few of the officers of the command had small shelter-tents, which were put up when the weather was bad, and on this particular night Captain Elliott, Dr. McKee, myself, and some others had indulged in this luxury; but the tents being white, they were first-class

targets, and good guides for the Indian rifle-balls and arrows that reached our camp very soon after dark, and the tents *came down*, much to the amusement of the officers who did not have them.

The pickets were carefully posted, two or three men together, and at one particular and important point ten or fifteen were placed, with very positive instructions as to their duties, and above all things cautioned against making a light of any description. Everything went well, except an occasional shot from Indian or picket, until two or three o'clock in the morning, when rapid firing from this big picket told of the trouble going on there. Later, when all pickets were called in, it was found that one of the men was mortally wounded, and more than half of the others slightly, and nearly every man's clothes were cut at some place with arrows.

The trouble was started by the attempt of a Dutch soldier, contrary to *positive orders*, to light his pipe. It is supposed he was lonesome and wanted to dream of the old country. As is often the case, the man who committed the fault, by lighting his pipe, *was not* the *man*, as he should have been, who was *shot*, but was one of the few who escaped entirely.

Plain signs were observed in the morning, by the trampled grass, numerous moccasin-tracks, etc., just how the Indians had approached this picket, and where they crouched in the grass when shooting their arrows. They were very close, and only used bows and arrows. Of course the light from the match and pipe had given the Indians the location of the picket, just what they had probably waited hours for. Arrows were found sticking in the ground and lying about in the grass in large numbers. The badly-wounded man died during the day.

Our next day's march was in the direction of Fort Defiance, and with the assistance of a few Mexicans who were with the expedition the captured sheep were much easier to drive and keep in compact order, and gave but little trouble, but their constant bleating was in our ears the whole day long, and night, too, for that matter, all of which enabled the Navajos to locate our position, by day or night, without exposing themselves to our rifles.

A few hours' march took us entirely out of the Calabaso Plains, and we again began to ascend as we moved towards the post. When well up on the side of the mountain, about on a level with the Chelléy Cañon, and while marching over a country almost destitute of soil and vegetation and miles from any water, we came across a tree nearly as large around as a man's body lying on the ground. It must have been dead when it fell, as the trunk and limbs were broken into quite a number of pieces, just as would be the case in the falling of a dead tree. But the queer thing about it was that from root to branch it was *petrified*,—it was a *tree* of *stone*, and there was no water for many miles. Let those who can explain do so if they wish to, I cannot.

Our camp, this first night from the Calabaso Plains, was in a beautiful little valley, on a small stream or spring of clear running water. The valley was rather too small, as the proximity of the small timber and rocks bordering it were in easy range of an Indian gun to our camp.

A good deal of amusement was caused that night among the officers in selecting places for their beds, consequently much guessing was indulged in as to the probable point the Indians would select from which to fire into our camp after it became dark. The great anxiety was to get out of range, or the line of fire, from these points, and find some cover to shield ourselves against them. And the officer who had a rock near his position big enough to put the head of his bed behind or against was thought very lucky, even if the rock was no more than a foot high. There were no small tents put up on this occasion.

Officers of the Rifles rarely ever carried their sabres on an Indian campaign, nor did they allow their men to do so, being useless and in the way. But nearly every officer had a double-barreled shotgun, in which, for such occasions, he used buckshot cartridges. And, by the way, I would to-day rather have a quick-firing gun with buckshot cartridges for *close work* for cavalry, against Indian or civilized man, than any other arm.

On this particular night every officer in the command who had a shotgun lent it to the men on picket duty, and muskets with buckshot cartridges were also utilized for the same purpose. It was not long after dark before the peculiar *flat* sound of the shotgun and the "smooth-bore" musket (so different from the *crack* of the rifle) was heard.

On examining the ground in the vicinity of the pickets next morning, many evidences were seen that Indian and pony blood had been spilled during the night. A freshly-killed pony was found, blood on the grass and bushes was discovered near the stations of the different pickets in plenty; and weeks afterwards a dead Indian was found in the vicinity of one of our camps, showing the deadly work done with shotguns and muskets with buckshot cartridges. The usual instructions to the pickets were to lie (or crouch) perfectly quiet, and be on a keen lookout all the time, and when anything coming from the outside was near enough to insure success to fire.

After a few lessons from these shotgun pickets, it would have been perfectly safe if there had been no guards at all, and about the camp at night was the most peaceful time of the twenty-four hours.

The next day's camp was within ten miles of the post, and early the following morning we went in. Permission was given to the troops at the post to kill and eat of the captured sheep as they pleased. But after a few days' feasting on them, the remainder were driven some

distance from the post and slaughtered and allowed to rot on the ground.

While the main column was resting and refitting for another expedition, several smaller parties were sent out for a day or two from the post to make sudden dashes into Navajo camps, for the purpose of killing and otherwise distressing the tribe as much as possible. It is very probable the Indians thought there was a heap of fuss made about the killing of one worthless negro; not likely calling to mind other outrages they had been committing for several years past.

Captains Lindsay, Elliott, and Hatch each took command of these short expeditions or dashes into the enemy's country, and with very good effect, as it kept the Indians in a state of turmoil and unrest.

I remember an incident which occurred with a party under the command of Captain Hatch which may be worth relating. Captain Hatch's command succeeded in surprising a camp of Navajos, killing a few Indians and capturing sixty horses and other stock. The guide for the detachment was a Zuni Indian (a "Pueblo"), who during the excitement of the attack killed a Navajo woman and took from her a lot of trinkets, among which was a *stalactite*, which had been broken off from the inside of some cave. The Zuni informed me that this was a *great charm*, and would do many things when in the possession of an Indian, or even when worn by a white man, and would prevent the wearer from being killed in battle. As a great favor and mark of friendship it was offered to me, and accepted.

I asked the Zuni why the charm had not saved the life of the woman he had killed. He replied, because it was not worn fastened to the woman's clothes, but tied up with worthless articles and carried in a bag.

To please the Indian, and perhaps being a little superstitious (who is not a little, in some way?), I cut a groove around the stalactite, in which I tied a strong string, and then fastened it to the side of my hat with a piece of a half-dollar, and wore it there the rest of the campaign. The half-dollar had been cut into four pieces, and the remaining three were worn by some of my friends.

After the first scout (through the Chelléy Cañon) and smaller expeditions, above referred to, under Lindsay, Elliott, and Hatch, the leading men of the Navajo nation tried several times to make peace, but as one of the conditions to that end was the giving up of the Indian who murdered the negro boy to Colonel Miles to be punished as was deemed proper, peace negotiations were always broken off, the Indians claiming that it was impossible to capture the murderer, as he had fled, etc. However, as they were being pressed hard and losing stock rapidly, they determined to make a big effort for peace, and gave out that they would bring in the murderer, dead or alive. A *statement* by the Indians as to his death was not accepted as good evidence.

The Navajos at this time became very fond of showing a *white flag*, for the purpose of having a *talk* with the commanding officer, and to ascertain if it were not possible to bring the "cruel war" to an end. Colonel Miles generally saw these parties, and gave them a chance to talk and to smoke, and often to make requests that it was impossible to grant.

About this time it was rumored around the post and in the vicinity of the camp that the murderer had been caught and brought in by the Navajos. The mutilated body, or perhaps only the head, I do not now recollect which, was shown and claimed to be that of the murderer of the negro servant. However, close examination by a few Mexicans who were acting with the troops, and perhaps by the assistance of a Zuni Indian guide, it was found that the dead man, or his head, was that of a Mexican who had been living with the Navajos for many years, and of course had nothing whatever to do with the murder. No further attempts were made after this for the man's surrender, but a determination on the part of all to make the war as disagreeable and as harsh as possible for the Navajos.

As before intimated, they had many horses, and were all, men, women, and children, well mounted, and on account of their mountainous country were very hard to catch, as their ponies were much more active in a rough, rocky country than the larger American horses used by the army. And, besides, if one pony was broken down, or ridden to death, the Indian simply caught and mounted another. Consequently it was Colonel Miles's plan to hunt up their stock (sheep, etc.), knowing that where he found herds he would be pretty apt to find Indians, who would try to protect and hide them away from the troops. On account of these advantages for the Indians and the disadvantages for the troops, the Navajos did not receive the amount of *wholesome killing* which had been for so many years their due.

Another scout under Colonel Miles was made southwest of the post, with which a number of friendly Pueblo Indians went as allies. Although I was with this second main expedition, I do not remember the results sufficiently clear to tell about them, except that three separate cavalry parties were organized at one of our camps, and that a number of Indians were assigned to each of these cavalry detachments. I am under the impression that all of the detachment commanders quarreled with the Indians, or rather disagreed with them as to the manner of conducting the *raid*. I know I did with mine, and returned to camp within twenty-four hours, with no results except perhaps a big disgust on both sides. I was more apprehensive of trouble from my *friendly* Indians than from the *hostiles*.

The second party came in soon after I did with about the same experience, but the third did not return until the next day, as they had had a fight with the Navajos, and several of the friendly Indians

had been pretty badly wounded, and it took time to bring them back to camp. I think this last detachment was under the command of Captain George McLane, of the Rifles. This particular scout resulted in very little, except to ascertain that the Indians had, to a certain extent, deserted this section of their country.

On returning to the post again our *allies* went to their homes, a pueblo between (a little off the road) Fort Defiance and the Rio Grande. These Pueblos had suffered much from the raids of the Navajos, and of course were delighted at any punishment their old-time enemy might receive, no matter from what source it might come.

It was now after the middle of September, 1858 (just thirty-five years ago), and the nights about Fort Defiance, principally on account of the altitude, were quite cold, sufficiently so to form ice in our tents (at night) an inch thick, making it very uncomfortable in camp.

It was about this time that the Indians made a daring dash at the cavalry camp, the location of which was not much more than a mile from Fort Defiance.

To make the attack of the Indians understood I will try from memory (after so many years) to make the reader see the situation of the post, the camp, and the surrounding country in the immediate vicinity.

Fort Defiance, like most of the frontier posts in those days, was rather a poor affair. It was, I think, built of logs, the houses being (except perhaps one house) one story high, and arranged around a square,—both officers' quarters and those of the men.

The post was situated in a little valley at the foot of the southern and eastern extremity of the Tunicha Mountains. In facing south and looking along the Albuquerque road, you have to your right and west a high ridge or wooded spur of the mountains, not more than four or five hundred yards away, and five or six hundred feet high. To the left and east, and very near the post, a ridge of rocks (with a little soil and some underbrush) rises abruptly some one hundred and fifty feet, and runs south, parallel to the mountains (to the west) already mentioned. This spur and ridge form the little valley in which the post was built. There is a sharp cut, or cañon, entirely through this spur of the mountains (from top to base), through which a little stream (and a road) runs, and continues along by the post in the valley to the south, between the spur and ridge of rocks. This ridge terminates one or two miles from the post where a large valley opens out, with the Chusca Mountains to the east. Just before reaching the end of the rocks the cavalry camp was situated.

There were, I think, four or five companies of cavalry (Mounted Rifles) in camp, and under the command of Captain Lindsay, of the Rifles. The mountain (to the west) was covered with timber and underbrush down its side to the very edge of the grass in the valley

where the camp was, thus affording the Indians every facility to crawl up very close and wait for the most favorable moment to make an attack. This they did, and one afternoon about two o'clock they made a dash from the bushes on foot (a few were on horseback), and went directly for the cavalry horses, which were picketed very near where the men were lying and lounging about the camp. Their idea was to *stampede* the horses, but they (the horses) were such old campaigners, and had heard so many noises, that very little effect was produced by the yells and blanket-shaking of the Indians. But the Indians were so determined, that in several cases *lariats* were cut and horses mounted and ridden off, right in face of the fire from the soldiers.

A few men were soon mounted and the pursuit began, led by Lieutenant Averell, who could see his fine fast horse just ahead of him, ridden by a Navajo. After the point of the ridge of rocks was well passed, and the Indians with their few captured horses were fairly out on the plain, ten or fifteen mounted Navajos, who had been hiding, were seen to file right across the trail between the fleeing enemy and the pursuing soldiers. Of course this movement on the part of the supporting Indians was to delay as much as possible (by a show of fight now and then) the rapidly-approaching soldiers.

I was at the time acting as adjutant-general for Colonel Miles, and consequently had my quarters in the post; as soon as the firing began in camp I went to the top of the ridge, where I could see, with a field-glass, all that was going on. The plan of the Indians was good, and executed as if by educated soldiers, except they got very little stock when a great deal was expected. No soldiers were killed or wounded, and I suppose not much harm was done the enemy, although it was claimed that Indians were seen to fall, etc.

Officers were inclined to "poke fun" at Captain Lindsay, the officer commanding the camp, although the thing might have occurred no matter who commanded, being so unexpected and so unlikely to happen. It was thought *advisable*, I think, not to try to worry Captain Lindsay too much on account of the raid on his camp.

About this time (after the 25th of September) our express from Santa Fé brought us the news of the arrival of Major Backus with the detachment of recruits that had been on the way from Fort Leavenworth since about the middle of July. Those who had wife and child, or friends, with this party became very impatient for the end of the trouble with the Navajos; of this number I, of course, was one.

On the 29th of September, 1858, another scout, under Colonel Miles, left the post and went directly east, to the Chusca Mountains and Valley. The command was composed of four companies of Mounted Riflemen and one company of Eighth Infantry, under Lieutenant Willard.

Only a few days ago my wife, in looking over some old books and

papers, found part of a letter which I had written her, in pencil, while on this scout, which letter is now within two or three days of being thirty-five years old. She was then at Fort Union with Major Backus's command, but left soon after, *via* Santa Fé and Albuquerque, for Fort Stanton, my station after the conclusion of the trouble with the Navajos. The letter referred to was received at Algodones, not far from Albuquerque.

I will make some quotations from it: "September 29 (1858).—Left Fort Defiance at 7 o'clock A.M., traveled about east eighteen miles, and encamped in the valley of Chusca. After marching about six miles from the post struck a long cañon through a high range of hills or mountains.[2] After marching in the cañon four or five miles reached the top of a high ridge and came in sight of the valley, about seven miles to the east. Captains Elliott and McLane were detached to enter the valley at a different point from that marched by the command. Soon after these two companies were detached a large dust was discovered in the valley to the east. Lieutenant Averell with his company was sent to look after it. Averell returned shortly after we got into camp with six or seven hundred sheep and ten or twelve ponies. Elliott also soon returned. He had had a long chase after some Indians and herds; killed two Indians and had two company horses shot; two horses died from the hard run; captured about six or seven hundred sheep."

Colonel Miles's whole command remained quietly in camp that night and the next day until just before sundown, when everything was made ready,—horses saddled, mules packed, etc.,—and we quietly moved off in the direction of, and as if to return to, the post. Just before night we went into camp, evidently impressing the Indians, some of whom were always watching us, with the idea that we intended to follow them no further.

Soon after it was entirely dark three companies of Riflemen, under the command of Captain Lindsay, were detailed to make a raid to the east, the direction the Indians had gone, and if possible overtake and punish them. As it turned out, the Indians were completely fooled, outwitted, and entirely deceived as to our intentions, for they evidently thought we would go into the post next morning, and that they (the Indians) could call a halt to their fleeing friends and herds, who were then making the best time possible to the southeast over the worst country (part of it) I ever saw. Instead of going into the post next day, as our *red friends* thought we would, the three companies under Captain Lindsay left camp at ten o'clock at night and moved east in the direction of a rugged-looking *mesa* we had been looking at for the last two days, and towards which the main body of the Indians and their herds had gone.

[2] The southern end of the Chusca Mountains.

I will quote again from the old letter: "September 30 (1858).—Captain Lindsay was detailed to take three companies of Rifles, make a night march and attack an Indian settlement, and return to camp. I asked to go and take command of Company H, which was granted.[3] We marched at ten o'clock at night. Our course was east for about twelve miles, to the place where we expected to find Indians. We reached the objective-point about three o'clock in the morning, found no Indians, but did find a very *heavy trail*, leading south. Captain Lindsay determined to follow, although no one appeared to know exactly where we were going. After we left camp at ten o'clock at night we marched over an open prairie for about seven miles; we then struck the mountains[4] and marched up a very rough and dangerous-looking cañon for about five or six miles, ascending all the time, until we had reached, I suppose, about two thousand feet above the point of starting. We then bore off south for about five miles, when we came to a perpendicular termination of this high ground, when we discovered we were overlooking a valley, or wide cañon, of about three or four miles across and some fifteen or twenty in length. On the opposite side of this cañon, or valley, we saw the smoke of an Indian camp and a big dust, as if a large herd of animals was moving. We began the descent of a terrific-looking cliff (the side of the *mesa*) to the valley, a thousand feet or more below, by means of a terribly rough trail. The Indians had passed over this spot the day before, and in many places the rocks in the trail were covered with blood, where the animals had cut themselves by slipping and falling. Just before reaching the bottom of the trail we saw three mounted Indians[5] coming towards us. We were not seen until they were almost directly under us, and then they turned about and put the whip to their horses, dropping everything that would prevent them making the best time possible. They made directly for the Indian camp across the little valley, to save themselves and to give the alarm to their camp.

"As soon as six or eight men of Company H (which was in the advance) had reached the bottom of the trail, Captain Lindsay ordered me to come on with him at the gallop. I told him it was not prudent or safe to go on with so few men, and asked him to wait until the entire company got down, which he did. We then put off at the

[3] I was at this time acting as Colonel Miles's adjutant-general. My company, A (Elliott's), was with the command but was not sent on this raid.

[4] This was without doubt the side of the rugged-looking *mesa* seen from our camp. The *mesa*—if it had a name at that time we did not know it—is the one known to later maps (from its position) as Mesa Fachada.

[5] On the approach of these Indians, Captain McLane, myself, and, I think, a soldier dismounted and crawled a short distance down the side of the *mesa* for the purpose of shooting these Indians off their horses, to prevent them (doing just what they did) giving the alarm; but they proved to be *women*, and we *did not* shoot.

gallop in the direction of the Indian camp. I also asked him to leave word for the other two companies to follow as rapidly as possible, thinking from the size of the trail and other signs that we might come across more Indians than *one company* could manage. We galloped across the cañon, or valley, a distance of about five miles, and on reaching the opposite side we saw the Indians making for a sort of by-cañon running perpendicular to the main one. Our Mexican guides[6] gave chase at once, yelling like devils. They soon overtook and killed two Indians, being at the time about twenty yards in front of Captain Lindsay and myself, and the head of H Company. After going over a very steep wooded ridge, about five hundred yards across, we struck the small by-cañon about a half-mile from where it opened out on to the valley we had just crossed. When we reached the top of this ridge and had gone a little way down the opposite side, we came suddenly in sight, and not five hundred yards away, of a very large Indian camp with large herds of sheep and horses. We made a rush for the camp at a full run. The Indians commenced firing on us as soon as we were in reach of their guns. We succeeded in cutting off about *four thousand sheep* and *seventy-five horses*. The firing now became very brisk, the Indians gathering rapidly on both sides of the cañon.

"I soon saw, or thought I did, that we would be overpowered, and all probably killed, if we did not quickly secure a strong position until the other companies arrived. I noticed just ahead of us about one hundred yards a small wooded knoll, which I proposed to Captain Lindsay to take possession of, dismount the men, and defend ourselves until re-enforced by the other companies. We made a dash for the little hill and took it, with no other damage than the wounding of one horse. We had two shots from this hill as we dashed up, directly at the head of the column, and not more than fifty yards away, and although the balls whistled very near, not a man nor horse was hit. After getting possession of the hill, the horses were made fast to the bushes and the men put under cover, and distributed in a circle around the top of it. We were now ready to make a strong defense, and waited as patiently as we could for the arrival of the other two companies. Our greatest fear was that they would not be able to follow our trail, as the last half-mile of it was very rocky.

"I now proposed to Captain Lindsay to send back four soldiers and some Mexicans[7] to notify the other companies of our position, and

[6] There were with the troops of the Navajo campaign twelve or fifteen Mexicans employed as guides and scouts, and they were as brave and as efficient men as any I ever saw, no matter of what nationality, and their hatred for the Navajo Indians was as marked as their bravery. I am sorry I cannot remember the proper spelling of the leader's name, but will try to give the sound. It was something like this: Captain *Blas Lucero*.

[7] Captain Blas Lucero, spoken of in the note above, with ten or twelve

to hurry them up. This was done, but at great risk to the men sent; but they managed to get back to the open ground, out of the cañon, without being hit.

"The Indians now began gathering on all sides of us and firing from all directions,—we returned the shots when there was a chance to hit. To judge from the terrific yells of the Indians and the number of shots fired by them, one might have supposed our days were numbered, but little harm was done, as the men were well covered by the bushes and trees. . . . In about half an hour after the Mexicans broke through the Indians the glitter of the brasses on the men's rifles, of Captain McLane's company, was seen on the crest of the ridge, and in a few minutes the soldiers were in the cañon, dismounted and skirmishing with the Indians, who were soon driven out of range.[8]

"The Mexicans began at once getting the captured stock together to drive it out of the cañon. As soon as the stock got well under way the two companies followed, Company H in the rear. The Indians had gathered on the sides of the cañon and hills in front of us, and as soon as I with H Company got opposite to them they opened fire on us. The balls fell all around us, but, strange to say, only one man was hit,—that was a sergeant, shot through the thigh. He bled a great deal and soon became very weak from loss of blood. Some of the men picked him up, while the others returned the fire[9] of the Indians. We very soon after this reached the plain, and were out of the cañon and out of reach of any guns the Indians had. . . .

"It was found, soon after getting out of the cañon, that two men were missing, and no one could tell what had become of them, but very soon a horse belonging to one of them was seen coming towards us, and in a few minutes trotted up to the command; the other man, his horse, or equipage, was never heard of again."

This letter from which I have been quoting gives a more reliable account than I could possibly give from memory of this raid under Captain Lindsay, because it was written the day, or the following day, after the events occurred.

After the captured stock and everything was fairly out of the cañon, and out of range of the guns of the Indians who were skulking among the rocks and bushes, and the sheep and horses "rounded up,"

of his Mexican scouts, waited a good opportunity, and with great daring broke through the Indian lines and notified one of the companies of our position and situation.

[8] Lieutenant Averell's being the rear company in getting down the *mesa*, he did not see the Mexicans sent to notify him of our position, and passed the point where Company H turned off to go into the cañon without seeing our trail, and went to the left and east, where he had an affair with the Indians. He joined us with his company soon after we got out of the cañon.

[9] I had dismounted the company, and had thrown the men (all except the horse-holders) out as skirmishers, on the flanks, on foot.

the men were allowed to dismount, picket or hold their horses, and rest.[10] They had been in the saddle or skirmishing for twelve hours. They threw themselves on the ground in all sorts of attitudes, and took all the rest possible under the circumstances.

Many of the men had been a little improvident during the night in the use of the water in their canteens, and were now entirely without, and none could be found in our immediate vicinity except from a shallow pond which had been used by the Indians, and the herds of sheep and horses had been in and through it until it was almost liquid mud, or rather *filth*. It was impossible to drink this stuff, but many of the men would fill their mouths with the cool mud from the bottom of the pond, hold it for a few minutes, eject it, and then go through the same process again; this would cool the mouth and give a little relief for a short time.

It was decided not to attempt to return to Colonel Miles's camp on account of the distance, the difficulty of driving the captured stock over such a route, the want of water, etc. And having ascertained from the Mexicans that it was only about twelve miles to the Albuquerque and Fort Defiance road—and *water*, Captain Lindsay determined to go to that place and then communicate with Colonel Miles, which was done.

With some difficulty two poles were found suitable for making a "stretcher" for the wounded sergeant; between these poles a blanket (or blankets) was fastened, and the sergeant put on it, the men taking turns in carrying, at the four ends of the poles. It was a tiresome job, but the best we could do with the means we had.

To the great joy of every one, water was found after marching about five miles. Men and horses, and all, were much relieved and rested, although the quantity of water was not very great. However, the big supply found when we finally reached the road, about five o'clock P.M., was a delight to all, as we not only had plenty to drink, but enough for bathing purposes also.

Soon after drinking, looking after the men and horses, and having a good wash, I made a little fire, and in a few minutes had a splendid cup of tea,—*good green tea.* I boiled the water in my tin cup, put in the tea, and then let it "draw." When all was ready, I called Lieutenant Averell and divided with him. His delight and surprise were almost beyond words, and to this day, when *General* Averell and I

[10] About this time I pointed out, or called the attention of the Zuni Indian guide to the *stalactite* fastened to my hat (spoken of on a preceding page), whereupon he at once said, "That saved your life in the cañon," or words to that effect.

The natural shape of this stalactite was like that of an Indian arrow quiver, and on account of the association was taken to Caldwell, the jeweler, in Philadelphia, in 1859, and fashioned more like a quiver, and properly mounted, with Navajo bow and arrow carved on the gold, with date, etc. It was used many years as a shawl-pin; it has been retired.

meet, he still *harps* on that cup of tea. And *it was good*, there is no doubt about it. Every officer and man, before starting on the trip, was, of course, provided with at least one day's rations (the officer providing for himself) of bacon and crackers, but I had in addition tied up a little *tea* and *sugar* in a *rag*, and had put the little package in my saddle-bags.

I think we reached Fort Defiance the next day, or the day after that, and Colonel Miles with the infantry and the other company of Rifles came in about the same time.

I will now try to make a speedy end of this long yarn of *personal* experience on the frontier in the *fifties*. Let an old fellow start out on by-gone days, whether they are "the days of small things" or large ones, it is pretty hard to choke him off, and knowing this (I have some friends of that kind), I will *try* and *quit*, whether I am through or not. Consequently I will hurry over the remaining incidents in the Navajo country and join my family at Fort Stanton.

It was now getting well along into October, and the nights were cold, as might be expected, as Fort Defiance was seven or eight thousand feet above the level of the sea.

Some officers in tents about the post had dug holes in the ground (to correspond to the shape of the tent) four or five feet deep, over which they had pitched their tents; this arrangement, with a small stove or fire-place, made them quite comfortable.

The next scout under Colonel Miles went north along the east side of the Tunicha Mountains, where he was joined by a column of troops from the direction of the San Juan River, northeast from Fort Defiance. With these troops came some Ute Indians, as allies and friends, or rather, as *enemies* of the Navajos.

Some of the officers who had just crossed the plains with Major Backus were with these troops, and as a matter of course many questions were asked concerning the wives and babies who were with the party.

It is my impression that the Ute Indians became dissatisfied and, I think, went back home from this place. It is likely there was small prospect for plunder, or they were unable to run things in their own way.

There must have been very little of interest occurred on this trip, as I remember hardly anything about it. I do remember, however, that it became very cold before the return to the post, and also that Dr. James T. Ghiselin, United States army, was my bed-fellow for the trip, and that I thought him very unfair when it came his turn to change position, and to *warm my back*. I have long since forgiven him, however, as he, first and last, has done for me many a good turn. One that I shall ever remember was that he and his steward, just before leaving Fort Stanton for one of my Pecos trips (here-

tofore spoken of), spent some time in pulling a big back tooth for me. The thing is done *quicker* now.

On this particular scout we were generally in the mountains, or where the country was very rough and broken, and had plenty of wood for fires, and cedar and pine brush to build shelters for the night, and consequently did not suffer as much from the cold as might be supposed.

For some days, in fact for the entire trip, we saw very few Indians, and those did not come very near us, and if we approached, disappeared in the rocks and gorges of the mountains. And they showed, after some sad experiences, great respect for our long-range rifles, and I have no doubt had the same opinion of them the Pine Ridge Indians had, a few years ago, of the Hotchkiss-gun. It was a "shoot to-day and kill to-morrow gun."

It was observed that no matter whether we saw Indians or not during a day's march, or heard them at night, they were certain to be seen in the morning riding into our just abandoned camps as soon as the soldiers were sufficiently far away to be harmless.

It was determined to give them a good lesson and perhaps kill a few of them, and the bush shelters, built for the night by officers and men, played an important part in the programme. The plan was to leave in these bush shelters a half-dozen or more good shots, and when the Indians approached our supposed deserted camp and innocent-looking bush huts, and were quite close, to *fire*, at the same time hiding near a supporting party, in case its services became necessary. Everything succeeded well, and it was claimed many Indians were killed and wounded in this way. Of course, after the news got around among the Indians that the abandoned camps and bush houses were dangerous, it was useless to try to trick them further. It is probable, however, that one of our old camps would have been a safe place for one man, even, to stay for a day or two.

To show how very alert the Navajos always were, I will relate a little incident which happened the day before (or two days before) we returned to the post. I was directed by Colonel Miles to detach two companies of Rifles, to the right and left of the trail, to look for Indians, Indian signs, and herds; but before the companies were out of sight I was directed to recall them. I took a bugler and galloped a short distance ahead and had the "recall" sounded. I saw that the companies understood the call, as they at once turned about and marched towards the main column. I returned to the trail and waited for Colonel Miles and the two recalled companies to reach me. The bugler was near me, and I gave him orders to wait also on the trail, as the troops were in sight and close at hand. As soon as all were up we moved forward again on the trail, but had not marched ten minutes before we came to the dead body of the bugler, lying on the ground

flat on his face and stripped of everything except his gloves and stockings. The Indians had killed him with arrows, and had taken his horse, in fact, everything he had. He had five or six broken-off arrows in his body, all of which seemed to have been shot into his back.

This incident showed very plainly that there were Indians around whether we saw them or not, and as there was quite an ugly-looking cañon to go through almost immediately, it was thought best to examine it before the cavalry got into it with their horses to impede their efficiency in such a position. Consequently a company of infantry was ordered to march on each side (on top) of the cañon and clear the way for horses, pack-train, etc. The Indians were, or rather had been, there, and the signs showed they had been quietly waiting for us, and in quite large numbers. It was probably a fortunate thing for the rest of the command that the bugler had been killed.

For days after reaching the post white flags were shown by the Indians from many points, and a desire expressed by leading men of the nation to talk with Colonel Miles, with a view to peace. Colonel Miles saw quite a number of them, they frequently bringing their wives, who sat and patiently looked and listened while their lords and masters discussed *national affairs.*

I was still acting adjutant-general, and generally received the bearers of the white flags, and as the Navajos had adopted the custom of the Mexicans, of embracing on occasions of ceremony, I had many a *hug* from chiefs and leading men. I did not like it, as it was a little too close quarters. The odors were not like that from a flower-garden either, and I *did not love* them. Some of the young officers accused Colonel Miles of hugging the *wives* and daughters, while my duties were entirely confined to the husbands, brothers, etc. Of course the acting adjutant-general did his best, as in duty bound, to suppress this slander against his chief.

However, peace was finally made, some time in November I think, and I with a strong escort was sent with the terms agreed upon to department head-quarters at Santa Fé. I made good time, and at Albuquerque left my escort and traveled alone from that place to Santa Fé. I remember the department commander was not pleased (but agreed, however, to the terms), thinking the Indians had not been sufficiently punished. The loss of property on their part was sufficient, but there had not been *killing* enough done. We were all agreed on that point, but there is a quotation from an old cook-book that will cover the case: "First catch your rabbit."

It was learned some years after this that the *winter*, when the snows were deep, was the time to make war on the Navajos. This plan and time was afterwards adopted, and succeeded perfectly.

It may have been a mistake altogether to destroy so many of the

Navajo sheep and ponies, for the loss finally fell on the people along the Rio Grande, as the Indians would not wait for the growing lambs when they could *steal* from their neighbors (the Pueblo Indians and Mexicans) full-grown sheep. And as for horses, it was a pastime and pleasure for a young Navajo man to *steal* them wherever they could be found.

I received permission to go direct to Fort Stanton and there await the arrival of Captain Elliott's company (to which I belonged as first lieutenant) from Fort Defiance.

I returned at once to Albuquerque, and again joined the mail-party for Fort Stanton. There were four men (mounted) in the party and a pack-mule. I left my baggage to come on later in a wagon, and only took with me my blankets and what clothing I could carry on my horse. We made a late start from Albuquerque, which caused us a good deal of trouble before the day and night were over.

The old road from Albuquerque to Fort Stanton runs almost directly east for perhaps twelve or fifteen miles, when it passes through a low range of mountains—hills or high ground—bordering the Rio Grande Valley. In the gap, or cañon, through which the road passes there is a little town, or settlement, known as Tijeras (or Tejiras). A short distance after leaving the town the road entered quite an extensive woods, and then bore off south towards Manzano and Fort Stanton. Just after getting into the woods a mile or so the pack on the mule became disarranged, and while putting it to rights one of the men threw his arm over the pack, and the mule at the same time giving a jump in the air, forced the man's arm up and out of joint at the shoulder.

I spent much time in trying to get the arm back in place, but could not, so had to order the man to get back to the army doctor at Albuquerque the best way he could.[11] It was the best and only thing to be done under the circumstances. The time lost in working with him was a very serious matter to the rest of us, as the little settlement which we hoped to reach was yet a long ride ahead, and it was, and had been, snowing very hard, nearly covering the road out of sight.

As night approached, things became much more serious, as I frequently had to dismount and scratch away the snow with my hands to hunt for the wagon-ruts, to ascertain whether or not we were going in the right direction. I finally had to give it up; it was dark and we were lost, or rather, could not go on, on account of darkness and the disappearance of the road. The next best thing to do was to seek as sheltered a place as possible where we could spend the night. We soon found a big cedar-tree in a grove of smaller ones, and under this tree the night was passed.

[11] He did not reach Albuquerque until the next day, and was in a very bad condition,—was in hospital for a week or so.

The inner bark of a cedar-tree is nearly always *dry* and easy to light, consequently, after getting together some small dry sticks, we dug off with our knives a lot of the bark, and then rubbed it between the hands until it was almost a powder, in which condition it was easy to light.

Lighting a match in the open air when the wind is blowing is not the simplest job in the world, but to this add cold, wet fingers and shaking hands, and it becomes an interesting business, especially when matches are scarce. However, after many failures, and when there were not more than a half-dozen matches left, one caught, and our bark and small sticks were soon blazing, and in a very short time we had a good fire, and were beyond any chance of freezing before morning.

We were close enough to the settlement to hear the dogs bark, but I was afraid to attempt to travel by the sound, thinking the dogs might fail to continue the bark long enough for our purpose.

The men gathered wood and kept a big fire going all night; the horses and the mules stood with noses close to the fire, and as some protection from the cold the saddles were left on them. I did some little sleeping, but I do not think the men attempted it, seeming intent on looking after my comfort. It was occasions like this that showed the kindly feeling of the enlisted men for their officers. These men need not have looked after me at all, but if I had allowed it they would have put all their blankets on me, and their overcoats too, and have sat and shivered around the fire until day dawned. They thought, perhaps, I had been having hard work and exposure in the Navajo country while they had been doing little, and that I ought to be looked after and taken care of.

It was a very, very long night indeed, but the longest one must be followed by the day. As soon as it was light enough to ride we mounted and were off, and within an hour we had found the road and reached the little Mexican town. Our horses were soon stripped, watered, and fed, and we were not long in getting some bacon, coffee, and bread, and I think added the luxury of boiled eggs.

The sun came out bright and beautiful,—what a contrast to the day and night before!—and after a good rest we again got under way, and made a long stretch towards the Gallinas Mountains. The snow became less deep as we went on, and, strange to say, when we did finally reach the mountains there was hardly any. Nothing occurred of special interest during the rest of the trip, and I will leave the reader to imagine the pleasure it gave me when I turned the point of the hill and came in full view, and close at hand, of Fort Stanton.

I found my wife living with and "messing," as usual, with her sister, Mrs. Elliott, and the baby was there all right,—no longer a baby, however, but a big girl, and much bigger in her own estimation

than she really was, and about the only one at the post who always protested before obeying an order.

Now, there is nothing blood-curdling, heroic, nor very exciting in all this, but I have not been writing romance, simply plain, straightforward facts and occurrences that actually took place, and such as were liable to fall to the lot of all officers on the frontier (in the fifties), particularly the younger ones, and more especially those of the cavalry.

I was very soon on duty again (almost immediately), and entered on my *fifth year* of constant frontier service. And although the same old, necessary routine duty was very tiresome, I found it not *quite* so monotonous as when my family was in the East. Late in December or January, Captain Elliott rejoined with his company at Fort Stanton, and everything went on again as if we had never been away.

And thus ended *seventeen months'* frontier service in the fifties, a "sample" for all the year round.

W. B. Lane,
Brevet Lieutenant-Colonel U.S.A.

MY MILITARY FRIEND, MR. EGAN.

A RECOLLECTION.

It is almost twelve years ago since I first donned the uniform of a second lieutenant in the Twenty-sixth Regiment of United States Infantry in Uncle Sam's little army.

I was like all youngsters just joining,—ambitious, military, rather short of funds, but thoroughly self-satisfied. Was I not one of the select of the country,—the wearer of a pair of shoulder-straps that carried with them honor, dignity, position, and fourteen hundred dollars per annum?

Some weak-minded cits had perpetrated a few puerile jokes in regard to the slimness of my waist and moustaches, but I knew they were only actuated by envy and jealousy. My new uniforms were simply perfect, and though at first my sword would persist in getting between my legs at most inopportune times, I soon overcame that. Twelve years ago,—it hardly seems credible,—and yet the gray hairs that have crept amidst my auburn locks, and the absence of waist, fully convince me that my figures (if not figure) are (is) correct.

The company to which I had been assigned was stationed at Fort Soken, Washington, at that time a rather desolate and lonely sort of spot, and accessible only by stage or government wagon. I had notified the post adjutant of the exact date of my arrival at Soken Falls, the nearest railroad station, about fifty miles from the post, and when I arrived there about six o'clock P.M. one October evening, I found a man in overalls and an army overcoat (for it was rather cold), who made for me as soon as I descended from the rather uncomfortable day coach. At the time I was surprised at the man's almost instant recognition of me, but later on I recalled the fact that there were only four other passengers, two of whom were women, and of the other two, one was a half-breed and the other a stockman of about fifty years of age. "This is the leftenant?" (he pronounced it leftenant) he said, in a half-familiar, half-respectful manner, at the same time changing his quid of tobacco to the other side of his mouth. When thoroughly convinced that he was right, he informed me that he had a wagon and four mules to take me ("pack" me, he said) to Fort Soken.

"We can start to-morrow morning," he further informed me, "and make Haines's Ranch, about thirty miles, and get into the post the next forenoon."

Telling him that I would be ready at the appointed hour, for I thought I had no say in the matter, I wandered over to the hotel a little way off from the rude, wooden platform called "the station."

One thing, however, bothered me. I had heard a great deal about the hospitality and free off-hand manners of the West, and I wondered whether or not I had better ask the driver to have a drink. I did not know whether he was citizen or soldier, and though I had no doubt of the acceptability of a drink, I hardly knew how to go about it. A few minutes later, however, the difficulty was solved for me by the landlord, who informed me that I could get supper just as soon as Mr. Egan came back from the stable.

Mr. Egan proved to be the driver as I had supposed, so I invited Mr. Egan and the rest of the men standing about to take a drink. They took it, and Mr. Egan took a particularly big one. Though the landlord looked somewhat askance at one "Faro Pete," one of the loungers, who did me the honor to drink with me, and whose drink almost rivaled Mr. Egan's, he smiled affably at aforesaid Mr. Egan, and, if I recollect rightly, the mighty man even winked at him. I no longer doubted Mr. Egan's importance; he might be a driver of a four-mule wagon, but he was, nevertheless, a man to be known and admired. At supper, Mr. Egan presided with a disregard for the little niceties of the table that almost ventured on greatness. He helped himself to all the choice bits of our somewhat meagre fare, called the tall, buxom, working waitress "Josie," asked for pie twice, and picked his teeth with his fork when supper was over with an air that settled any doubts I might have had in the premises.

My confidence in myself rather deserted me, and I think I was quite polite and affable to Mr. Egan during the balance of the evening.

The next morning, some time after seven o'clock, after a really palatable breakfast of bacon, eggs, boot-leg coffee, and hot corn-bread, Mr. Egan drove up with the wagon. I paid my bill,—and when I think of it now, I am seized with the conviction that I must also have paid Mr. Egan's,—and, having put my trunks, etc., in the wagon, climbed up on the seat already partly occupied.

The transportation provided by the quartermaster was a light spring wagon with one seat and plenty of room for my traps. The team of four mules was a really good one. I tucked the robe about my legs, nodded affably to the assembled crowd, my driver cracked his whip (the flourish was something to see), and I was at last really on the way to my post.

It was a beautiful morning, the air somewhat chilly but thoroughly

invigorating, and as we drove on across what seemed a boundless prairie my spirits felt a strong sense of exultation. Candidly I felt like singing, but what would Mr. Egan think? so I gave myself up to the beauty of the morning and the pleasant occupation of investing in real estate (in Spain).

How would I be received? Would I like my regiment? Would the men like me? Were there many ladies at the post? Any fishing? Hunting? And heaven alone knows what I didn't think of as I rode along that bright, happy October morning twelve long years ago.

My companion was very quiet for the first few hours, and I was perfectly satisfied busy with my own thoughts. By and by, however, the silence was broken by Mr. Egan's question, "Did the leftenant have the presence of mind to secure a bottle" (he didn't say of what) "before leaving?"

I silently handed him my silver flask of really good rye whisky (brought from the East), and for some little time was quite interested in calculating whether or not he would be able to drain its entire contents at one draught.

He did not, however, but as they say in the wild and woolly West, "He done noble." I think the ease with which the liquor slipped down his throat was a source of surprise to him. He gazed at the flask and then at me.

"Leftenant," he said, "I think they watered it on you, it don't burn worth hell room."

I gazed somewhat ruefully at the rather empty flask, but consoled myself with the thought, "Greatness has its privileges as well as duties."

However, we drove along at a good rapid rate, and at about four o'clock P.M. reached Haines's Ranch. I must hurriedly pass from this time until about ten o'clock A.M. the next day, when we came in sight of Fort Soken, so aptly termed by many officers "A hole in the ground."

The manner of Mr. Egan had undergone quite a change during the last few hours of our drive on the second day. In fact, the great man seemed somewhat depressed in manner, and I noticed that on several occasions he had answered some question of mine in a subdued and painfully polite manner. Before I could arrive at any satisfactory explanation for this sudden change of demeanor we were already on the reservation, and a few minutes later the wagon halted in front of the adjutant's office.

It is not my intention to write in this paper of my welcome to the regiment. That will require a paper of its own, but as this is particularly devoted to Mr. Egan, a few more words of him before I close.

The next morning I learned incidentally at breakfast that Mr. Egan was Private William Egan, Company C, Twenty-sixth United States Infantry, and a few days later my eyes caught sight of the great and mighty warrior picking up leaves in front of the commanding officer's quarters, while behind him, fully equipped and armed, stood Private Clavey of D Company.

Speaking in soldier parlance, "Egan was in the jug.[1]"

I think this was my first rude awakening in the army.

THOMAS H. WILSON,
First Lieutenant Second Infantry, U.S.A.

[1] In confinement.

AMONG OUR CONTEMPORARIES.

In these days when foot-ball—so called because there is not much footing about it—is all the rage, and when our military and naval academies have their "teams," as if the lads had nothing in the world to do but have their knee-joints injured, it is rather amusing to see the point of view of Mr. James Payn, in his *Notes for the News*, upon this most engrossing and important subject.

He says of a recent Scotch scrimmage over this gentle game: "The effect of a 'friendly suit,' one has been told by laymen engaged in it, is not always what might have been expected from its name as regards the costs, and the same mistake, it seems, may arise in other contentious matters outside the law courts. The notion in Glasgow, for example, of a 'friendly game' at foot-ball is new and strange to persons who are not devoted to that seductive amusement. At the beginning of the proceedings one player was sent off the field for fighting, and another for flinging the ball in the referee's face. The deciding point of the game was made by 'a penalty kick,' adjudged for a disgraceful 'foul' of one of their opponents' 'backs!'" The wording of this is obscure; one has heard of a "half back," which, I suppose, is a back that has been kicked in two; but the meaning is only too obvious. If it were otherwise, the truth comes out with a vengeance in the final lines of the report: "The referee was seriously assaulted on attempting to leave the ground, and the police had to protect him in the pavilion"—not, like David, from "the strife of tongues," but from much more serious weapons—"with their drawn batons." What can it be in foot-ball that breeds this blackguardism? Cricketers do not cheat, or beat one another with bats and stumps. At what Mr. Caudle calls the national and atheletic game of cribbage the players keep pegging away without breaking the peace. At whist, to be sure, the candlesticks are fastened to the tables (in case a partner should not return one's lead in trumps and the temptation to throw something be overwhelming), but, as a matter of fact, no acts of violence are committed. They are excluded by common consent from amusements which come under the head of a 'friendly game."

We must add that there is no use in arguing that it is a manly game, and tends to the promotion of some of the finest qualities which need

pluck, training, and courage. It has, to the writer's knowledge, seriously handicapped more than one fine young fellow for life. It certainly breeds more animosity than cricket, or boat-racing, or even base-ball.

For youths who are being trained, at great public expense, for the military and naval service, it seems to be an improper competition, because there are many other ways in which "teams" could compete strictly in the line of their profession without chance of life damage. How would a skirmish drill do, or the competitive erection of a sea-coast battery, with its emplacements, etc.? There would be plenty of good work about that, and the young gentlemen could get just as muddy and dishevelled, and would not have to wear those ridiculous nether garments which make them look like clowns in a circus, or a Dutch fishing skipper.

When Captain David Porter, during the war of 1812–15, with England, went to the Pacific Ocean to break up the English South Sea Whale Fishery, among the twelve midshipmen of the "Essex" who sailed with him were two who lived to come to high command. One was David G. Farragut, and another was Thomas A. Conover, who commanded the United States squadron on the coast of Africa before his death, and who died a commodore in 1864. Another of the twelve was Henry W. Ogden, who died a captain.

This is a large proportion of such a number of midshipmen to have lived to attain a high rank, especially as the conditions of their early service were unusually severe. One of the twelve, who appears to have been an officer of great prominence, named Cowan, was promoted to a lieutenancy soon after the "Essex" reached the Pacific, and was killed in a duel with a messmate at the age of twenty-one, being buried at the Gallapagos Islands.

The fate of Stephen Decatur McKnight and Midshipman Lyman was most tragic. After surviving the great slaughter which took place during the obstinate and desperate resistance of the "Essex" against the "Phœbe" and "Cherub," these young officers were taken in the captured vessel to Rio, to testify as to condemnation, and were to go on to England, if considered necessary. This was in virtue of an arrangement between Captains Porter and Hillyar.

But, being discharged from attendance at Rio Janeiro, they took passage in a neutral, the Swedish brig "Adonis," on August 22, 1814, but on October 9 this vessel was overhauled by the United States sloop-of-war "Wasp," which had lately sunk the "Reindeer," an English sloop-of-war, and was then bound on a cruise. McKnight and Lyman seized the opportunity, left the "Adonis," paying their passage and taking their luggage. "They paid me their passage in

dollars at 5*s.* 9*d.*," says the Swedish captain in his journal, which may be interesting to some in these "silver" days.

As is well known, the fate of the "Wasp," after these young veterans joined her, is one of the mysteries of the sea. "She never was heard of more."

But this is all by the way, for volumes might be written about that romantic cruise of the "Essex." The foregoing lines were suggested by the finding, the other day, in the collection of the Historical Society of Pennsylvania of a "Log Book and Journal" bearing distinctly upon the events which have just been recalled. A regular old-fashioned log-book it is,—bound in canvas and tied with linen tape,—and most conscientiously kept, in the unformed hand of a youth, who, however, had to do a man's work. It is the "Journal of W^m^ W. Feltus, Midshipman on board the U. S. Frigate 'Essex,' on a cruise. D. Porter, Esq^r^., commander, Oct^o^ 25, 1812."

Above this inscription on the title-page is written "The U. States of America declared *War* against the Kingdom of Great Britain on the 10th day of June, 1812, ADomini."

Below this statement is a very fair pen-and-ink sketch of a frigate on a wind, off a lone and mountainous island.

The history of Porter's successful voyage—as far as the breaking up of the English "South Sea Whale Fishery" was concerned—is well known, as are the subsequent events of his capture by immensely superior force; but Midshipman Feltus was not on board the "Essex" at the time of her great struggle. He had been left at Nukaheeveh, where Porter had gone to refit and revictual, as one of the officers of Lieutenant Gamble (afterwards major) of the marines, who had charge of several prizes, in the shape of English letter-of-marque whalemen, which were moored in a bay in "Nooahevah," as Porter calls it, while he himself, in the frigate, and the "Essex, Junior," went over to the South American coast again.

There were "beach-combers" in "Nooaheevah," even in 1814, and these, with traders, did not want such a settlement there, and as soon as Porter had gone they began to make trouble. To avoid weakening the crews of the "Essex" and the "Essex, Junior," Porter had left with Gamble a number of the English prisoners from the whale-ships, who ended in making trouble also, as a matter of course. They were considered as a part of the crews of the prizes, and yet were under no allegiance or pay. Still, Gamble, who was a strict disciplinarian, held them with an iron hand for a time, assisted by Midshipmen Feltus and Clapp, who were really mere boys. They had a fort on shore, pig-yards, gardens, and all the ships to take care of with a handful of men, many of whom were ill-disposed. Then the warlike natives had only been kept under by a show of force. When Porter sailed for the coast the renegades on shore spread the report the "Opotee" had gone, never to

return; the natives became restless, and soon the English captives rebelled, carrying with them a few English sailors who had been among the "Essex's" men. It is gratifying to know, in this state of things, that the few born Americans left with Gamble were true as steel; but, out of the small number, some were hopeless invalids, and the mutineers were in a majority, besides having the well men. Feltus's journal (which the lad kept up in the most exemplary manner, in spite of the labor and anxiety and trouble of a youth in his position) terminates abruptly, and this is the reason:

"May 7, 1814.—At ½ past 8 P.M. the mutineers [here he gives the names] put Mr Gamble, Clapp, and myself, with Worth and Sansbury, 1 cask powder, and 2 old muskets in an old boat, and made the best of our way in." (The mutineers had risen in the morning, wounded Mr. Gamble severely, and confined him, with the two midshipmen, in the "run" for several hours, until they were almost suffocated.) Feltus goes on to say in his journal, "Belcher remained on board, but called out to Lieut: Gamble and several others to witness that he was obliged by the mutineers to stay. At about 10 o'clock we got on board the 'G——' ["Georgeanna," one of the prizes], when we found they had spiked all the guns, and those in the fort on shore. In the morning employed carrying the sails to the 'Sir A. H.' ["Sir Andrew Hammond," another prize], our crew consisting of 11 souls, 3 of whom are officers, one of the men wounded, and another aged."

The very last entry in the journal is,—

"Sunday, May 8th, 1814.—Shifted the 'Sir A. H.' out in the bay——"

The poor fellow was killed by the natives within a short time after these words had been written. A working party on shore had been attacked by the natives, or "Indians," as he always calls them in his journal, and Feltus, with the few left on board, hurried on shore to the rescue, leaving Lieutenant Gamble, disabled by his wound, alone. In the fight which ensued Feltus was killed and others were wounded. One of the latter, Coddington, swam off, a distance of nearly half a mile, bleeding profusely from wounds caused by the native slings, and Midshipman Clapp managed to save the rest by great courage and exertion. They would certainly have been followed on board, and overwhelmed by numbers in the boat, which was their only means of escape, had not Gamble, wounded as he was, and in a violent fever, managed to hobble on deck and fire the great guns into the crowd of natives, who had not yet conquered their fear of cannon-shot, even when they did not come near them. Captain Porter says in his narrative,—

"In reflecting upon this melancholy event, my readers cannot but form some idea of the poignant feelings under which I labour [they spelled it with a *u* then], in common with lieut: Gamble. To the

latter, especially, the stroke came with redoubled severity; for he loved young Feltus with the tenderness of a brother, and ever felt a deep anxiety in his fate. In the sixteenth year of his age, and possessed of every accomplishment which could command respect and admiration, he was at the same time actuated by a noble ambition, which no untoward circumstances could repress. He bid fair to become an ornament to his profession and an honour to his country. Those who knew him personally admired his youthful gallantry; and placed, as he was, under the command of lieut: Gamble, by his own request, I cannot but lament that so cruel a destiny should have awaited his intrepidity and spirit."

Who knows whether we did not lose another Farragut when this messmate of his fell under the sling-stones and war-clubs of the savage in the successful attempt to rescue his shipmates? Of those three officers we have seen the fate of one. Clapp returned home, and resigned about 1816. Gamble lived to be a major and brevet lieutenant-colonel, and died in 1836.

Considering how he was situated at Nukaheevah, and the character of the force under his command, Gamble was a man with the courage of his opinion, and a disciplinarian, first of all. His men were constantly being seduced by the beach-combing traders or the native girls, who were their emissaries.

Poor young Feltus gives us a touch of Gamble's quality which is remarkable, when we consider that many of his men were *pressed*—that is, prisoners, working whether they would or no—and his officers two boys of sixteen and seventeen. Feltus writes, under date of March 6, 1814, in the ordinary "log" form,—

"One of the men deserted. Mr. G. took 8 men, and found him in an Indian house. Put him in irons. At 10 A.M. gave him 5 doz: lashes, and again put him in irons. Day ends warm."

It certainly did for the deserter, whose name is not given by Feltus. We feel as if we would like to know it. Perhaps some may think we have dwelt too long upon such a subject, but to the writer the discovery of the log-book of this brave dead boy was a delight and pleasure which we hope may be shared by some others. It corroborates and confirms many of the statements in Porter's book in a remarkable way, and is a distinct contribution to our naval history on that account. A nephew of the midshipman is now a citizen of Philadelphia, a gentleman well versed in naval matters, yet he did not know of the existence of this "Journal" until his attention was called to it.

Who can tell us how this gallant boy's journal reached its present safe resting-place? The writer supposes that some of Major Gamble's family may have found it among his effects and sent it to the Historical Society. But it is only a guess.

For twenty years or more people who have taken up their summer residence about Buzzard's Bay and the Vineyard Sound have endeavored to change the names of "Wood's Hole," "Holmes' Hole," and others to "Holl." It is supposed that such persons thought that "Hole," in connection with a place, was vulgar. On the contrary, it is such persons who are vulgar. They have, however, succeeded so far as to get the "Summer Tourist" books and the newspapers to use their spelling. We don't know whether the "United States Board on Geographic Names" has sanctioned it or not.

Recently we have found a supporter in the protest against the altering of ancient names in Mr. Bliss, the author of those delightful books, "The Old Colony Town, and Other Sketches," and "Colonial Times on Buzzard's Bay." He says on page 56 of the first-mentioned book, in the "Ambit of Buzzard's Bay,"—

"From time immemorial Wood's Hole has been the name of the village and its two harbors, and of the narrow water-way which separates the island of Naushon from the main-land. There is a record dated in the year 1677 of a laying out of lands at 'Wood's Hole;' and also an Indian deed of the year 1679 of all that tract commonly called Wood's Hole Neck."

The name is therefore historic. On the shores of Buzzard's Bay a "Hole" apparently means a pocket of water, a cove, a sea passage-way through islands, into which vessels may run for a shelter. For such places it was a common name with Englishmen of the Plymouth Colony. In their records of the year 1651 I find mention made of the "water side or creeke commonly called and known by the name of Hobs Hole;" so named by the "Mayflower" colonists in the year 1623. In the year 1677 mention is made of "Billington's holes neare unto or upon Jonses River." In the same year the colony gave to Jonathan Morey "three score acrees of upland att the salt water pond by the way between Plymouth and Sandwich." This pond took the name of Morey's Hole, and it has been known by that name to this day.

In the year 1875 the voters of the village, "with one exception," signed a petition to the Post-Office Department of the United States to change the name to "Wood's Holl." That "one exception" deserves a monument. His act was an intelligent protest against the manufacture of false history on Buzzard's Bay. The theory on which the petition rested was that Northmen from Scandinavia "passed along Cape Cod through Vineyard Sound to Narragansett Bay, where it is believed they settled;" and that the hills around Wood's Hole were called "holls" by the Northmen.

A great deal of history has been attributed to those hardy men, who "bravely fought like heroes bold, and ruled the stormy sea;" but there exists no indisputable evidence that they ever saw Buzzard's Bay. Some writers say that they ventured as far south as Boston

harbor, and these persons have testified to that faith by setting up a stone tower on a bank of Charles River. Anybody can set up a tower, or a statue, or perhaps a new post-office to commemorate an opinion. Boston contains a statue which represents an opinion that Leif Ericson and his crew discovered the North American continent in the year 1000 or thereabouts. The reputation of this Northman as the discoverer of some western world rests entirely upon the stories of the sagas of Iceland, written some three hundred years after the alleged event. Nothing in literature is more untrustworthy than the statements of these flowery compositions, in which, as has been said, "the story-telling of the fireside has overlaid the reports of the explorer." Indeed, many students of history believe that the heroes of the sagas were fictitious characters, as much so as were those who sailed to Colchis in search of the Golden Fleece, as told in old Greek poems, and that the narratives of the sagas have no more basis on truth than have the narratives of the Iliad. It is possible that roving seamen from Scandinavia, freebooters or fishermen, may have reached the northeastern shores of America, but, as Mr. Bancroft intimates in his history, there is not to be found an authentic vestige of their presence on any part of the continent now occupied by the English race, notwithstanding the Charles River tower, the Boston statue, and the transformation of Wood's Hole into Wood's Holl. There is one consolation,—not all the post-office orders or advertisements of cottage agents will change the name among the coasters who use those waters. As long as Monomoy is a "p'int," so long will "Wood's" and "Holmes'" be "holes" to them.

Space did not permit a notice of the yacht races of October last, about which, after all, there was not so much to be said. Those most interested in the "America" Cup said least about it in print. It was a god-send to the reporters and the newspapers, and the steamboat owners, and they made the most of it.

But there is just one thing which we would like to say,—even at this late hour,—and that is, that in case of another international race taking place, we hope that those in charge of it will see their way to having it at some other place than the course usually selected. The reason is plain, for the excursion steamers and other craft crowded around the contestants like a parcel of roughs about a dog-fight in the street. Even supposing they did not interfere with a start or a finish, which they certainly did to some extent, the whole thing was unsportsmanlike, and the presence of the excursion craft must have diverted the attention of the owners and skippers, to a certain extent, from the proper management of their yachts at critical periods.

A course some distance away, and inaccessible to a certain element, would, we should suppose, be much more satisfactory to the contestants.

The German military bands still use the pyramid of small bells, or cymbals, much in the shape of the horse-tail standard formerly carried by the Turks. In this country they were in use in marching bands forty or fifty years ago, but seem to have been abandoned almost entirely. "Jingling Johnny" was, we believe, the name applied in England to the individual who carried the apparatus—used to mark time—with the same dignity as a drum-major uses his baton. According to our recollection they were always called the "Turkish bells" in this country. Cymbals were much more used in bands at that time, and it is possible that the picturesqueness of the bearer and his instrument, as well as the softness of the sound as compared with cymbals, made the "Turkish bells" a favorite instrument at that period.

The English papers are continually urging the increase of their already enormous navy, and not without good reason if the arguments advanced are well founded. Especially does Sir George Elliot insist that, however gigantic the task, they must not only numerically outclass any two or three other nations in battle-ships and cruisers, but that a certain proportion of such vessels must be of such a character as to enable them to outstrip and overpower any commerce-destroyer which may be built by other naval powers. In discourse about the matter the English *United Service* remarks,—

"To what fearful straits this country would be reduced were our fleet, in the event of war, found to be inadequate to perform the many duties it would be called upon to fulfill, the imagination refuses fully to realize. Cut off from our supplies of food and of raw material—a danger non-existent in former times—we should soon be reduced to a state of want and panic. When we were at war with Napoleon Bonaparte we claimed provisions to be contraband of war on the ground that, in the then condition of France, when there was a reasonable hope of starving her into peace, to supply them contributed to prolong hostilities. In view of the possibility of the tables being turned, it would be well for us, as advised in Captain Mahan's admirable work on the influence of sea power, to remember this fact."

The Huguenots who went abroad during their enforced emigration did well for the most part wherever they cast their lot. In our own country their descendants have, in many instances, held offices of high

trust and honor, and stand to-day among the best people in the land. It was therefore with much interest that we read in the *Canadian Military Gazette* the following story about one of them, who is said to be "the French commander of the Siamese fleet," the account being taken from "a Paris paper." It concerns "Commodore Armand du Plessis de Richelieu, a descendant of a Protestant branch of the great cardinal's family. It has been discovered that a Danish nobleman, Armand du Plessis de Richelieu—probably the same—kept a bar about six years ago at Bella Vista, a suburb of Corrientes, in Argentina, which was much patronized by Indians and cowboys of the Paraguay border. He lived in a humble hut with his wife, who appeared to be a lady much above her situation. A pair of dogs, called tigeros, accompanied them. Later on he became military instructor in Paraguay, but he made enemies there and was expelled, the French residents in particular being most bitter against this descendant of the Huguenots. Wherever he went he carried a beautiful Renaissance inkstand and a brace of holster pistols, which he said belonged to the cardinal. Our French contemporaries rather savagely express the hope that if ever he is captured by the good sailors of France he may be hanged as a common pirate. Another journal says that he springs from a younger branch of the Du Plessis family, which remained Protestant when the senior branch—the ancestors of the cardinal—became Catholic. After the Edict of Nantes the younger branch emigrated to the Cape, where it is said still to exist."

If this yarn is true,—and there is no reason to suppose it is not true, far more startling careers have been heard of in the case of adventurers,—there is no more reason why he should have been hung by the French, if captured, than they should hang any other person at war with them. This Duplessis, if the account is correct, is no more a Frenchman than Marshal Patrick Maurice McMahon was an Irishman. Then, again, the French have no more business in Siam than the English have in Matabele Land or the Germans in Kilimandjaro.

When these questions come up we have been charged with similar practice in regard to the Red Indians of our own country. But the cases are not parallel. In the progress of our occupation there has been a continual overlapping, and necessity for extension and for supremacy over the indigenous race for the sake of safety for the more powerful one. Much as one might regret it, the situation was forced upon us, just as it was forced upon the English by the Maöries of New Zealand or the wretchful *indigines* of Australia, who speared the cattle and the sheep,—ay! and the shepherd too. No right-minded person can say that England was wrong in her occupation of *these* countries. The gradual extinction of the native tribes was only a corollary. Then, too, in the case of the Maöries, and of our own red men, they were a warlike, stalwart race, who must be met in their own way, and it

took *men* to fight them. But with these outlying countries, where so many European nations are enacting the fable of the wolf and the lamb to-day, it seems a questionable proceeding, if even the great matter of "extension of trade" justifies their operations, when they are carried on against unaggressive and peaceful people.

The *Army and Navy Gazette* lately contained the following editorial remarks:

"Russia, it is said, proposes to add two new army corps to her already overwhelming military strength, as a balance to the increase in the German army authorized in the army bills, and thus the weight of armaments is to be increased all round. With reference to this point, the *Cologne Gazette* points out that the German successes in the war of 1870 were gained by their great superiority in numbers. They won the battle of Wissemberg with 44,000 men and 72 guns, against 25,000 French and 18 guns; at Wörth there were 96,200 Germans with 342 guns, against 36,800 French with 131 guns; at Spicherin there were 38,400 Germans with 120 guns, against 24,000 French with 70 guns; at Sedan 155,000 Germans with 700 guns, against 90,000 French with 408 guns; and at Gravelotte 240,000 Germans and 160,000 French, with the usual preponderance of German artillery. Now, however, things are different. Before the passing of the new German army bills France was numerically about as powerful as Germany; but it was thought by the Germans that France could not go on increasing her numbers any further, and that therefore, if the German army was increased, a predominance would once more be obtained. If, however, Russia, the ally of France, is to reply to Germany's increases of numbers, finality is as far off as ever, and the outlook in the direction of further increases of European armaments becomes appalling."

E. SHIPPEN.

NAVAL AND MILITARY NOTES.

NOTES AND DATA ON NAVAL AND MILITARY MATÉRIEL AND ALLIED SUBJECTS.

It is the intention to collect and publish in this department of the "United Service" all information obtainable from current publications and other available sources concerning ships, guns, armor, explosives, small-arms, military and maritime affairs, and kindred subjects. As the data are derived largely from unofficial sources, strict accuracy cannot be expected; but all reports will be carefully examined and compared with others on the same subject, and it is hoped, by this means, to attain fairly correct results. Erratum notices will be published whenever errors are discovered in data previously given. As the development of the present plans for collecting information progresses, it is hoped to secure fuller and more authentic reports.

United States.

The reports of the Secretaries of War and Navy have proved to be unusually interesting to the services, containing as they do the usual account of the work of the preceding year, and the forceful and original ideas of the present Secretaries.

The report of the Secretary of War starts with the expenditures and estimates for the years 1893, 1894, and 1895, as follows:

Expenditures for the year ending June 30, 1893, nearly $52,000,000. Appropriations for year ending June 30, 1894, about $48,000,000. Estimate for the year ending June 30, 1895, nearly $53,000,000.

The only active duty the army has been called on to perform against armed enemies has been the suppression and punishment of violations of the neutrality laws of this country and Mexico.

The Secretary points out that no considerable increase in the numbers of our army is necessary or likely, but that considerable changes in the distribution of troops and the relative proportions of the branches of the service is absolutely necessary for maximum efficiency.

He points out that the present organization of 25 regiments of infantry, 10 of cavalry, and 5 of artillery was established to meet conditions which have almost ceased to exist.

At thirteen of our large sea-ports work has already begun or is projected, which in extent and nature within a few years will call for the establishment of organized posts of artillery. From this he draws the deduction that the conversion of a number of organizations of infantry to the artillery arm is a manifest necessity of the period directly ahead of us.

The total apparent strength of the army on September 30, 1893, was 27,922 officers and men; with this small force permanency in the *personnel* is desirable. Among the officers this is assured, but the changes in the enlisted men have been great. The army lost 9456 men during the year. He recommends that the laws regulating enlistment be modified by the reduction of the period of first enlistment from five to three years, and by the repeal of the act limiting to ten years the maximum period of service of enlisted men.

The Secretary renews the recommendation of his predecessors for a three-battalion organization for infantry regiments.

In regard to the usefulness of separate organizations of Indian troops, it is pointed out that the widest diversity of opinion exists, the arguments of neither side being strong, but not sufficient to either do away with Indian troops or justify stopping the experiment with the present small force.

The adoption of the .30 calibre magazine rifle for the army is dwelt on as the

most important step taken by the army since the Civil War.

Ten 5-inch guns were completed during the year at Watervliet and ten more are in process of manufacture. Carriages for these guns will be made at Rock Island Arsenal.

Ten 7-inch howitzers have been completed and ten more are being made. No carriage has yet been fixed on for these.

A number of 3.6-inch steel field guns and field mortars will soon be completed and issued to the artillery.

Fifteen 3.2-inch steel field guns will be completed this year, giving the army in all 165 guns of that calibre.

The annual capacity of the Watervliet Gun-Factory is stated will be fifteen 12-inch guns, fifteen 10-inch, and twelve 8-inch.

The Secretary briefly reviews the work of the different branches of the army establishment, and concludes with an appendix giving the detailed expenditures of the War Department for the year ending June 30, 1893.

The report of the Secretary of the Navy for this year gives a most comprehensive summary of our navy as it stands, and deals in the most direct manner with its needs, as to material and *personnel*. The following are extracts from it.

The report begins with a statement of the progress made since the last report, showing the fact that nine vessels have been launched in that space of time, while six new vessels have been completed, accepted, and commissioned. The speeds attained on trial were in most cases in excess of the requirements. In fact, the large premiums secured caused much comment. The Secretary, however, argues that these premiums are not mere gratuities, or clear profit to the builders of the vessels. They are incentives to diligence, and have not resulted in injustice to the government, for the shipbuilders have always taken into their calculations, when bidding, the amounts it was possible to earn as premiums. To avoid disputes, which have occurred in the past, in the new contracts, the contractors have been required to defray the expenses of trial trips.

The report shows that the total number of serviceable war vessels now in the United States navy is 41, fifteen of which are armored. In addition there are 64 vessels on the list, mostly wooden cruisers, tugs, and antiquated monitors, that are set down as unserviceable for war purposes. Tables are given showing the naval strength of leading powers, and a comparison drawn from them places the United States seventh in the rank of naval powers.

The Secretary requests authority to devote the $450,000 authorized for the construction of a vessel similar to the *Vesuvius* to the construction of three torpedo-boats, and also recommends an increase of the limit of cost of the swift torpedo-cruiser authorized by the act of 1890, so as to enable the Department to have this vessel laid down during the next fiscal year.

The Secretary gives a long account of the delays experienced in building ships as a result of the failure of the steel companies to furnish the necessary armor. He says that of 12,300 tons, covered by the two principal contracts, only 1949 tons had been delivered on the first day of March last. The great difficulties experienced by the armor-makers have, however, all been overcome, and deliveries of armor are now being made with satisfactory rapidity.

Surveying the whole field, the Secretary finds much to be proud of in the knowledge that we can furnish the material for and build modern ships of war as quickly, and without any doubt as well, as any company in the world. He feels confident that some of our shipyards rival the best in Europe.

The vessels completed since March 4, 1885, cost $25,000,432, and the premiums aggregated $586,916, the heaviest premium, $200,000, being earned by the *New York*. This statement does not include the *Columbia* and other vessels completed since the end of the last fiscal year. In addition to these there are now in process of construction or authorized to be built vessels upon which have been expended $26,701,056.

The Secretary devotes much space in his report to the discussion of naval ordnance and armor. He says that the

weight of foreign opinion is in favor of limiting the size of guns to 12-inch calibre and the weight to 50 tons. He believes that the new 8-inch nickel-steel gun, ready for assembling, combining the employment of a material never before used for a gun construction, with an entirely new process of assembling, will give increased efficiency at greatly reduced cost of manufacture.

Comment is made upon the growing foreign practice of installing on war ships as many rapid-fire and machine guns as can be properly protected, and towards the extension of the rapid-firing system to guns of higher calibres. The smokeless powder manufacture is still regarded as being in the experimental stage, and if further developments demonstrate its success, under service conditions, it will be issued for use on shipboard without delay.

Reference is made to the remarkable success of the steel-makers in producing armor-piercing projectiles in this country, and it is said that they are equal if not superior to any shells made abroad.

The Secretary reviews the work of the small-arms board during the past summer, and says that he has approved its recommendation that the navy be equipped with a magazine rifle of .256 calibre to use a smokeless powder which will give a muzzle velocity of 2400 foot-seconds, and effective range of a mile and a half, and employ cartridges of such weight as to permit not less than 200 rounds to be carried per man.

The armor-plate tests during the past year have in cases exceeded in severity any ever attempted, either in this country or abroad. The results have conclusively demonstrated the desirability of using the Harvey process for the armor of all the vessels now under construction.

An interesting set of experiments was made to determine the protection afforded to ship frames by the ordinary nickel-steel and the Harveyized plate. The result was that the Harveyized plate absorbed the energy of the ball in crushing it, while the untreated plate received nearly all the energy within itself and racked the vessel. A heavy untreated plate was driven back bodily seven inches by a ball of less energy than one which attacked the Harveyized plate, almost without result. These and other experiments induced the Secretary to order that all of the armor already ordered, and not too far advanced, should be treated by the Harveyized process.

A chapter in the report treats of the submarine torpedo-boat, and the investigations and recommendations of the board appointed to deal with the subject. Before accepting any of the bids the Department is conducting a careful investigation to ascertain what would be the effect upon the crew of a submerged boat of the detonation of a high explosive under water near by. It appears that the Department is waiting for the result of the experiments with the 15-inch pneumatic guns now being constructed for the War Department before proceeding further with the test of the *Vesuvius*. The Secretary is evidently doubtful of the utility of this vessel, as at present equipped.

In that part of the Secretary's message in which he treats of the naval policy of the country, his directness of thought and knowledge of naval affairs show most clearly. He quotes a clause from President Cleveland's message to Congress of December, 1885, which is the key-note of his own article, and goes on to show how the navy of steel vessels has been built up; what progress has been made by manufacturers in furnishing material; what the policy of Congress seems to have been in adding one or two vessels at each session, and points out that we must not stop at cruisers, but must build battle-ships sufficient for our defense.

It is shown by illustration how much the military value of a commerce-destroying fleet is overrated, and that while it is irritating, is not decisive.

The Secretary argues that for coast defense torpedo-boats are more effective according to cost than any other class of vessels. He cites the English naval manœuvres last summer to show that eighteen torpedo-boats valued at $1,800,000, with crews of 360 men, destroyed a battle-ship and six cruisers valued at $9,750,000 and with crews numbering 2050 men, the difference of losses being, in money $7,950,000, and in men 1690.

The Secretary says that no one can

value economy more highly than he does, but the safety of the country, its honor, and its dignity, must rise above every other consideration, and the programme of authorizing the building of at least some vessels at each session of Congress ought not to be interrupted now. Therefore he recommends that the construction of at least one battle-ship and six torpedo-boats be authorized by Congress at the coming session.

The many duties of the navy, and the extraordinary duties in consequence of the unsettled political state of the South American republics, where more ships were needed than were on hand, are all adduced to show the necessity of keeping the navy on a strong basis as to numbers.

The Secretary calls attention again to the necessity for action in regard to the *personnel*, and says that he is engaged in the preparation of a scheme for the reorganization of the line of the navy, which will shortly be submitted to Congress. The causes of the present condition of affairs are clearly set forth. He recommends that the number of enlisted men and boys in the service be increased by 2000 men, as the present number is insufficient to meet the imperative demands of the service on foreign stations. He also recommends that the enlisted men of the navy may be allowed to become citizens of the United States without forfeiting their continuous service in the navy. He recommends further that the act providing for the examination of army officers, which has been extended to the marine corps, be also made applicable to the navy, finding that the present system of examination is faulty.

The trial of the *Columbia*, our first triple-screw cruiser, has been a magnificent success, she having made the unprecedented speed of 22.8 knots, according to the official report. The contract speed was 21 knots, so the builders will receive a premium of $350,000, or $50,000 for each extra whole quarter of a knot in excess of the contract speed. During part of her run the *Columbia* made 25.3 knots an hour. This speed is the greatest made by any cruiser of any size, though torpedo-boats and catchers have exceeded it; but it may safely be said that she is the fastest cruiser afloat. The German *Kaiserin Augusta* has made 22 knots, and the *Nuevo de Julio* 22.74 knots, as claimed, but neither of these had been made on the full displacement of these ships nor for so long a run. Had it not been for a slight priming of the boilers, necessitating slowing down a little to prevent water getting into the cylinders, it is certain that the *Columbia* would have made still more, might even have passed the 23-knot mark.

The following contains extracts from an editorial in the *New York Sun:*

"Russia has adopted the plans submitted for a canal connecting the Black Sea with the Sea of Azov, which converts the Crimea into an island. France supplies the money, estimated at only $16,000,000,—a bagatelle in these days of canal-building. The project has been contemplated since the conquest of the Crimea by the Ottomans. The Corinth Canal was built by French capital, at a cost of $13,000,000. The present republic has expended $200,000,000 in perfecting her internal water-ways.

"The North Sea-Baltic Canal, begun by Germany in 1883, now nears completion. Its width is 200 feet, depth 28 feet. It will be one of the great marine engineering achievements of the present century. This work, tending to the solidification of Germany, was conceived by Bismarck, and begun by him against the opposition of Moltke. Its entire cost will be $40,000,000, of which Prussia contributes nearly one-third and the empire the rest. Its total length from mouth to mouth is exactly 60 miles.

"The Manchester Ship-Canal to open for business throughout its length next month, has been by far the costliest of these undertakings. Railway opposition involved a preliminary outlay of over $2,000,000 in Parliamentary proceedings, and the companies have succeeded in exacting over a half-million of dollars in settlement of $3,000,000 claimed for alleged damages. One evidence of the enormous traffic this canal is likely to receive may be inferred from the uneasiness evinced in Hull lest she lose the trade which she has hitherto been able

to retain only in consequence of the high dock charges imposed by Liverpool. The Manchester Canal will cost, complete, $75,000,000.

"A lecturer before the Institution of Civil Engineers, London, recently paid a high tribute to foreign talent. 'It was impossible,' he said, 'to visit the Continent of Europe, the United States of America, or even Britain's own colonies without feeling conscious that in many respects their engineering works and their factories, to say nothing of their military and naval arsenals, exhibited the great advantages which had accrued from the employment of men of the highest scientific culture in the conduct of those enterprises.' The lecturer might in part have had in view the Italian fortifications and naval port at Spezzia, or the great engineering works recently begun in connection with the harbor of Palermo, or the works at the Lido port of Venice, already so far advanced that large merchant steamships are visiting it at high tide. Next year the port will be navigable for the largest vessels, thus crowning a work first taken in hand nearly five centuries ago.

"At another engineers' meeting recently a paper was read describing how the little creek that made the Tees, England, had been transformed into a navigable river, up which ships of the largest size can sail to the docks of Middlesburgh.

"The English lecturer may have had in his mind the sort of foreign works lying in this field of achievement. Among such he would needs account the ship-channel connecting Baltimore harbor with the deep water in Chesapeake Bay, completed last year after forty years of nearly continuous work. This has given Baltimore a channel 18 miles long, 600 feet in width throughout, and nowhere less than 27 feet deep at mean low tide.

"The feasibility of connecting Lake Winnipeg by canal with the Mississippi River is again being examined. It is suggested that a route by way of Lake Traverse and Stone Lake sufficient to allow the passage of light draught steamboats might not cost over $1,000,000. Within five years Canada will have a 14-foot channel from the sea to the head of the Great Lakes. Then the project must not be lost sight of, entertained by Canadian capitalists, of building a canal from Lake Erie to the sea-board *via* Lake St. Louis to Montreal, including a canal from Lake Champlain to tide-water on the Hudson. The question of a ship-canal between the Lakes and the Hudson has been settled by engineer Seymour's demonstration that it would cost $600,000,000.

"Of brilliant financial operations, few rank above the late Earl of Beaconsfield's purchase for the English Exchequer, without any authority of law, of $25,000,000 worth of Suez Canal shares. They are now worth nearly three times what he paid for them, and were about as cocksure an investment as could be imagined. The revenue they represent was a tax on British commerce, and to this extent that tax is now paid into the British Exchequer instead of into the pockets of French stockholders. Of course the profit was not the motive of the purchase. So the projected Nicaragua Canal, certain to be built in time, will apparently prove an operation not less brilliant than that at Suez. The slight appeal that ship-canals make to American capital at this stage of the game seems almost odd. A ship-canal across Florida might be premature, but why the projected canals across Cape Cod and the other across the Maryland peninsula are still waiting to be taken up is not so clear. The project for utilizing water-power to generate electricity for traction on the Erie Canal cannot come to much so long as terminal facilities remain what they are."

ARMOR TESTS.

On October 14 a test was made at the Naval Ordnance Proving-Ground of a 12-inch Harveyized nickel-steel plate representing the side armor of the *Maine*. The plate had the following dimensions and weight: Length, 13 feet 7 inches; height, 6 feet 11 inches; thickness, 12 inches for 3 feet 11 inches tapering to 6¾ inches; weight, 18.44 tons. The gun used was an 8-inch 35-calibre gun. Distance of plate from gun 320 feet. Line of fire normal to centre of plate.

Round 1, *first acceptance test.*—Charge, 79.5 pounds; striking velocity, 1678 f. s.; striking energy, 4885.6 foot-tons; energy per ton of plate, 264.9 tons; energy per inch cross-section of shot, 97.2 tons; ratio of energy to that just necessary to penetrate a wrought-iron plate of same thickness, 1.42.

The projectile was a Holtzer 8-inch armor-piercing shell weighing 250 pounds, hardened to middle of bourrelet; it struck the plate normally 60 inches from the left edge, and 31 inches from the top, and broke up into small pieces, largest piece recovered weighing 44 pounds, and total weight of pieces recovered 106 pounds. The point of projectile was welded into plate,—plate cool, pieces of projectile very hot. Fringe entirely chipped off, no bulge. Estimated penetration about 3.5 inches. Plate sound and uncracked.

Round 2, *second acceptance test.*—Charge, 109.1 pounds; striking velocity, 2004 f. s.; striking energy, 6968 foot-tons; energy per ton of plate, 377.8 foot-tons; energy per inch cross-section of shot, 138.6 foot-tons; ratio of energy to that just necessary to penetrate wrought-iron plate of same thickness, 2.03.

The projectile was a Carpenter 8-inch A. P. shell of 250 pounds, hardened ¾ inch below bourrelet. It struck the plate normally, 45 inches from the bottom, 35 inches from left edge, and 26 inches from first impact. The shell broke up similarly to former shell, more of it, however, remaining welded in the plate. The largest piece recovered weighed 21 pounds; total weight of pieces recovered, 135 pounds. Pieces of shell very warm, plate cool. Plate unchanged and uncracked. Estimated penetration, about 8 inches.

This round completed the *acceptance tests*, and the group of armor represented by this plate was accepted.

TRIAL OF RAPID-FIRE GUNS.

A competitive trial of the Hotchkiss, Driggs-Schroeder, and Sponsel rapid-fire guns took place at the Naval Ordnance Proving-Ground, November 1, 2, and 3, 1893, before a board appointed by the Naval Bureau of Ordnance. The test was a complete one, including the time required to change various parts supposed to be broken during use. 6-pound guns were used.

1. Ten service rounds were slowly fired from each gun to observe the action of the mechanism. All three guns proved satisfactory under this test.

2. Ten service rounds were fired at the butt from each gun, as rapidly as the smoke would permit, in order to note the facility of loading and aiming.

From this test the board concluded that with the Driggs-Schroeder two men could perform the loading, aiming, and firing with ease and rapidity; with the Hotchkiss gun it takes three men for these operations; and three men for the Sponsel gun.

3. Ten rounds were fired without aim as a test of rapidity, the guns being loaded at the start. Time for the Hotchkiss, 33.6 seconds; Driggs-Schroeder, 27 seconds; Sponsel, 32.5 seconds.

4. Fire, dismount, reassemble, and fire, noting time from fire to fire. Hotchkiss, time 1 minute 17.4 seconds; Driggs-Schroeder, 1 minute 56 seconds; Sponsel, 2 minutes 22 seconds.

5. Fire, change firing-pin, and fire, noting time from fire to fire. Hotchkiss, times 1 minute 32 seconds and 1 minute 5.8 seconds; Driggs-Schroeder, times 1 minute 53.6 seconds and 2 minutes 6 seconds; Sponsel, times 2 minutes 4 seconds and 3 minutes 1.2 seconds.

6. Fire, replace one extractor, and fire, noting time from fire to fire. Hotchkiss, 12.4 seconds; Driggs-Schroeder, 3 minutes 9 seconds; Sponsel, 19 seconds. The delay in the Driggs-Schroeder in this case was caused by improper handling of the gun in replacing the extracter.

7. Firing with defective rounds and excessive pressures, all the guns exhibited the same general features, with blow-backs resulting from defective ammunition and under excessive pressures.

8. Test of extractors. A case was loaded with sand and an empty shell, and was thickly covered with resin, so that the charge had to be driven in by a mallet. None of the three mechanisms had sufficient power to withdraw this round. A Hotchkiss extractor was bent, a Driggs-Schroeder extractor was broken,

while the Sponsel extractors were uninjured. The Hotchkiss extractor started the case, but could not withdraw it. No other part of the mechanism was injured in any of the guns.

Broken extractors may be removed in the Hotchkiss and Driggs-Schroeder without removing the block, and in this respect they are superior to the Sponsel.

The weights of the breech mechanism, including crank-handle, were found to be as follows: Driggs-Schroeder, 35.25 pounds; Sponsel, 59.5 pounds; and Hotchkiss, 67.25 pounds.

In simplicity the mechanisms were not found to differ materially; and other things being equal, the less the weight of breech mechanism the better. In this respect the Driggs-Schroeder was found to be much superior.

A majority of three out of the four members of the board decided on the merit of the three guns as follows: First, the Hotchkiss; second, the Driggs-Schroeder; and third, the Sponsel. The majority found that the superiority of the Hotchkiss over the Driggs-Schroeder was very slight; but the inferiority of the Sponsel to both the others was marked.

A minority report by one of the members of the board stated that he considered the Driggs-Schroeder superior to the Hotchkiss, and thought it should be placed first in order of merit for the following reasons:

1. It is more handy in use, as shown by more rapidity in loading and firing.

2. One less man is required to man the Driggs-Schroeder gun than the other two, an advantage where space is small.

3. Less power is required to manipulate the Driggs-Schroeder mechanism than for the Hotchkiss, which becomes fatiguing owing to the weight of the block.

4. The Driggs-Schroeder is more easily kept on the target, as there is but little jar in working the breech mechanism, while the jar in the Hotchkiss is marked in opening and closing the breech.

5. The lightness of the breech enables a better distribution of the weight for safety in use.

6. The number of working parts is considerably fewer than in the other guns, the action more direct, and the mechanism simpler.

¶ The Gordon disappearing carriage for the army 10-inch B. L. R. has passed a satisfactory test at Sandy Hook. Ten rounds were fired, the last six being continuous. The carriage is worked by hand, and stood the test very well. Full service charges were used.

A new electric feed has been applied to the Gatling-gun, which the inventor claims will enable the gun to fire an average of 2500 shots a minute. The cartridges are held in place on a thin strip of tin, and are fed into a horizontal opening. A small electric-motor operates the mechanism and feed.

A navy 13-inch gun will soon be ready for test at the Indian Head Proving-Ground. A number of guns are ready, but the 13-inch mount is not quite completed.

England.

During torpedo practice in Gibraltar harbor a torpedo-boat, belonging to H. M. S. *Rodney*, sank. One man was caught in the fire-room and drowned, the rest of the crew being saved. The accident was said to have been caused by the helm being put hard over suddenly while the boat was going at a high rate of speed.

The official full-power natural draft trial of the new first-class battle-ship *Barfleur*, built at Chatham Dock-Yard, and engined by the Greenock Foundry Company, took place with very successful results. The trial was to have been of eight hours' duration, but, owing to darkness coming on, it was limited to seven hours. The *Barfleur* is one of a pair of battle-ships of a new type, her sister ship being the *Centurion*, and has been fitted with triple-expansion engines, estimated to indicate 9000 horse-power under natural draft. The results of the trial were as follows: Pressure of steam in boilers, 148.48 pounds; vacuum in condensers, starboard, 27.3 inches; port, 27.7 inches; revolutions, starboard, 95.3 per minute; port, 95.9; indicated horse-power, starboard, 4962.18; port,

4932.22; total, 9894.40, or 894.40 in excess of the contract; speed, by the patent log, 17.165 knots. The trial was conducted with open stokeholds, and the fan-engines were not used once during the day. The boilers gave a good supply of steam, and the engines worked with perfect regularity throughout the trial, with an entire absence of hot bearings. The *maximum* horse-power developed during one hour was 10,615, while 10,070 horse-power was indicated for two consecutive hours. The forced draft trial of the vessel was highly satisfactory in every respect. The mean results were as follows: Steam-pressure, 142.4 pounds; air-pressure, 1.4 inches; vacuum, starboard, 27.7 inches; port, 27.4 inches; revolutions per minute, starboard, 104.8; port, 105.6; indicated horse-power, starboard, 6580 4; port, 6582.7; aggregate, 13,163.1. The contract was for 13,000 horse-power. The speed, by the patent log, was 17.537 knots. Either the *Barfleur* or the *Centurion*, whichever is completed for sea first, will be dispatched to the China station to relieve the first-class cruiser *Impérieuse*, which will complete her second period of service as flag-ship early in the new year.

The new first-class torpedo-gunboat *Speedy*, which was built and engined by Messrs. John J. Thornycroft & Co., has during the past month been undergoing an exhaustive series of trials off the Nore, in order to test more especially the capabilities of the new type of boilers with which she has been fitted by her builders, and which were guaranteed to develop under forced draft 1000 indicated horse-power in excess of that promised by other contractors in vessels of the same class and size.

After a preliminary run on September 28 to test connections and see that all was in readiness, the vessel left Sheerness on October 3 for a trial under natural draft. The boilers having been filled with Sheerness water, steam was got up in them to a pressure of 200 pounds per square inch in from 25 to 30 minutes from the time of lighting fires. At 7 A.M. the vessel left her anchorage, and on arrival in sufficiently deep water steaming was begun and continued for eight consecutive hours, with the following mean results: With an air-pressure of .58-inch in the stokeholds steam was maintained at a pressure of 183.3 pounds per square inch; and with a vacuum of 27½ inches the engines attained a speed of 206.4 revolutions per minute, and developed a total indicated power of 3043.7 horses, 1438.2 of which was given off by the port engines and 1605.5 by the starboard; the resultant speed of the ship—the mean draught of which was 9 feet 8½ inches—being 18½ knots by log.

It having been deemed advisable that on the further trials of the vessel distilled or fresh water should be used in the boilers, on account of the deposit found in that obtained at Sheerness, this was supplied, and some modifications having in the mean time been made in her steering gear, she on October 20, at 8 A.M., left Sheerness for a preliminary trial under forced draft. After some hours' admirable steaming on the part of the boilers and good running of the engines, the latter during part of the time indicating 4390 horse-power, with the vessel making 20 knots, one of the starboard engine crank-pins was found to be heating, and it was decided after its stoppage and examination to relinquish the trial for the day and return with the ship to Sheerness. The run back brought out the advantages of the twin-screw system of propulsion, for, with very easy steaming on the part of the boilers and one set of engines only in use, the vessel averaged over 11 knots for the three hours taken in covering the distance over which she had to return to her anchorage.

At 8 A.M. on October 26 the *Speedy* again left her anchorage at Sheerness and proceeded to sea to undergo the official three hours' full-power trial under forced draft. As some 40 miles had to be covered before getting into deep water, an opportunity was afforded of noting how easily the boilers responded to the demands made upon them for steam, as the speed of the engines and vessel increased up to the time of reaching the trial ground and setting the log. After running for four consecutive half-hours,—in which, with steam at 200 pounds pressure per square inch and the engines

making 245 revolutions per minute, 4564.5, 4674.6, 4635.9, and 4708.1 indicated horse-power respectively were developed by them, with a resultant speed of ship of 21 knots,—it was found while running the fifth half-hour that salt water was finding its way into the boilers, owing to a valve having been left open by mistake, whereupon it was decided to return to Sheerness.

The final official trial of the ship was completed on Tuesday last in very rough weather. Leaving Sheerness at 8 A.M., she proceeded to sea, and at 9.30 A.M. started on a continuous run of three hours' duration under forced draft, when the following mean results were attained: With an air-pressure of 1.7 inch in the stokeholds a steam-pressure of 193.6 pounds per square inch was maintained in the boilers with easy firing; the starboard engines with a vacuum of 27½ inches, and the port ones with 27 inches, made 247 and 243 revolutions per minute respectively, and developed a total of 4674.7 indicated horse-power, giving the ship, which was drawing at the time 7 feet 5 inches forward and 11 feet 9 inches aft, a speed of 20 knots in a heavy sea. Throughout the run the boilers showed no tendency to prime, and had a greater fan power been used it was evident from their working that they were capable of developing a much larger power than that given out by them at Tuesday's trial.

The *Speedy* is of the same general dimensions as the other vessels of her class ordered to be built under the Naval Defense Act of 1889, her length being 230 feet between perpendiculars, beam 27 feet, and displacement at load draught of 8 feet 9½ inches 810 tons. She has been fitted by her builders with triple-expansion twin-screw engines to develop 4500 indicated horse-power under forced draft and 2500 under natural draft, the steam for which is generated in eight of Messrs. Thornycroft's patented water-tube boilers, the first of the kind fitted to any vessel in the British navy, having a total heating surface of 14,720 square feet, and a grate surface of 204 square feet. The special feature in this type of boiler being the generation of steam from water contained within instead of outside of a number of tubes of comparatively small internal diameter, nearly the whole of the heat given off in the combustion of the fuel is absorbed by the tubes and utilized, and there is no unnecessary carriage of water within the boiler not required for steam generating purposes, as in the ordinary marine or locomotive types of boilers usually fitted, the weight of the Thornycroft boilers fitted in the *Speedy* when full being some 20 tons less than those of ordinary type fitted in gunboats of the same class. With this decrease in the weight of the boilers, there is in the *Speedy* the further advantage of increased stoking space, and ample room for examining the tubes, although the boilers are eight in number, instead of four, and are allowed only the same space in the ship as in other vessels of the same class and size. During the exhaustive trials the *Speedy* has undergone the temperature of the stokeholds under natural draft—they are cooler under forced draft—has never exceeded 100 degrees; accounted for by the fact that all the heat developed by the combustion of the fuel is absorbed by the steam-generating tubes of the boilers, and is prevented by their specially peculiar arrangement from passing to the outside and causing a radiation of heat therefrom into the stokeholds.

From the results attained on the trials of the vessel just concluded, the advantages claimed for the water-tube boilers fitted to her by the inventor have been fully realized, the following points having been specially brought out while they were under trial. The ease and rapidity with which steam can be raised to any pressure within the limit for which the boilers are constructed was shown in the short time required to raise it. The exemption from leakage was evidenced by the behavior of the generating tubes under the extreme ranges of temperature and pressure to which they were subjected, and from priming by the energetic circulation of the boiler water, effected by the special arrangement of tubes adopted. There was also an entire absence of the ejection of either flames or unburnt fuel from the funnels, from the small amount of forced draft required, and the large and effective heat-

ing surface causing nearly all the heat developed by combustion to be given off by the waste gases before they enter them.

The complete success of the above recorded series of trials of the Thornycroft water-tube boiler, a success which all who witnessed them fully and highly appreciated, would seem to infer that, when certain slight modifications of detail which have suggested themselves during the trials have been made in future boilers of the same type, we may look before long for a revolution in the art of fitting our war and commercial ships with steam generators.

Considering that the *Speedy's* boilers on the above-recorded trials have been stoked by navy stokers with no previous experience of the Thornycroft boiler, the results attained must be considered as eminently satisfactory, it being asserted by many that good results on such trials can only be obtained by stokers trained by the contractors, and that such results are never repeated by navy stokers. As a matter of fact, the stokers engaged at the *Speedy's* trials not only found no difficulty in managing the boilers, but reported that it was much easier to fire them than either marine or locomotive boilers having an equal size of grate.

The first-class battle-ship *Centurion* underwent her four hours' forced draft trial on October 6. With an air-pressure of 1.58 inches, a collective horse-power of 13,174, a coal consumption of 2.24 pounds per horse-power per hour, the ship made an average speed of 18.51 knots.

The torpedo-gunboat *Havock* made on her trial 78 knots in three hours, in boisterous weather, part of the run being made at the rate of 27 knots. In an 8-hour economical speed trial it was found that at 10-knots speed she could steam 3500 miles without coaling.

France.

Experiments have been made at Grenoble with the object of determining the effect of infantry fire at long distances, and the results show that the fire of the Lebel rifle at 2000 metres (2187 yards) is of considerable importance. At that distance 300 shots gave a percentage of hits of 16 66; the size of the targets was not given. A writer in the *Spectateur Militaire* refers to these results, and concludes that "a company of 200 men would easily fire 10 shots each in a minute, and these 2000 shots would (at 16.66 per cent.) give 333 hits at the ranges, and say 33 on the field of battle. If the most rapid fire possible was employed, the result would be nearly double." Under these circumstances the writer maintains that artillery could not take up a position in open ground, and that cavalry without the aid of some infantry would be helpless under such fire. General du Guiny, in his instructions to the Thirty-fifth Army Corps for this year's manœuvres, directs that infantry must not hesitate to open fire at 2000 metres if an opportunity presents.

The French government has issued instructions for laying down, in January, a new first-class battle-ship, to be named *Charlemagne*, of 11,500 tons displacement and 14,500 horse-power, and to have a speed of 18 knots. The total outlay for this vessel will be $5,450,000. Two other vessels of the same type will be laid down during the coming year. They will be named *Saint-Louis* and *Henry IV.* The armament of all these vessels will be four 12-inch guns, mounted in pairs in revolving turrets, fore and aft (this arrangement being the first application of its kind in the French navy), ten 5½-inch, six 4-inch, sixteen 1¾-inch, ten 1½-inch quick-firing guns, and eight 1¼-inch machine guns.

Plans for a new cruiser, to be named the *Catinat*, have also been approved. This cruiser will be 318 feet long and about 4000 tons displacement. She is intended for service on distant stations, and will be sheathed with wood and coppered. Her machinery will develop 9000 horse-power, and the speed will be 19 knots. The armament will be four 6½-inch, ten 4-inch, fourteen 1¾-inch, and four 1½-inch guns, all quick-firing. She will cost about $1,500,000, and will be built by private contract.

The three sea-going torpedo-boats *Chevalier*, *Mousquetaire*, and *Corsaire* have

just been added to the French fleet. The first named has made a little over 27 knots, the second 24.27 knots, and the third 24.28 knots.

Germany.

NEW CAVALRY DRILL.

The new German cavalry drill has been provisionally in use since last April, but no definite conclusion has yet been reached as to its value, as it was introduced too late to give it a trial during squadron drills. Officers were invited to criticise it, and have freely availed themselves of this privilege. While revision may be necessary in some respects, it is considered to be a great improvement on existing regulations. The spirit of the new drill is stated in a sentence of the introduction, as follows: "A troop, to be trained from the correct point of view, should on the battle-field have to unlearn nothing which it has learned on the drill-ground."

Some of the particulars of the new drill may be briefly stated as follows:

Dismounted drill is to be restricted to the limits of absolute necessity for cavalry purposes, special stress being laid on individual training.

The words of command have been simplified, many useless commands and moves having been abolished. The regulation step is fixed at 31½ inches; time, 114 paces per minute.

The commands "out of step" (or march at ease) and "resume step," though formerly in use, are now recognized for the first time in regulations, as well as the "running step," which is fixed at a length of 3 feet 3½ inches; time, 165 to 170 paces to the minute.

Dressing to the rear, formerly done in step, is now executed out of step much more expeditiously.

The old regulations formerly only recognized "turns" at a halt, but they may now be done on the move, thus facilitating changes of front at any time. The scabbard of the sword, with the sword sheathed or unsheathed, is always to be held at the centre of gravity. The sword when unsheathed is always "shouldered."

Firing and charging in two ranks has been introduced. A dismounted squadron is now told off and formed up in a similar way to a mounted one. On the whole there has been an endeavor to introduce more uniformity between dismounted and mounted drill.

When marching in columns of divisions the distance between two divisions is to be 7 paces.

Dressing and touch is now generally taken up from the centre instead of from the right, both when mounted and unmounted, and this principle has proved most advantageous in both cases.

In wheeling, the men are to dress towards the outer, while taking touch towards the inner flank; in forming line, dressing and touch is to be taken towards the flank from which the line is formed.

The regulations for dismounted drill are based on recent experiences, and are drawn up on similar principles to the new infantry drill.

The formation skirmishing divisions have been materially altered. Six to ten skirmishers are to form a group, and, as a rule, two or three groups to a skirmishing division. The men are required to secure their carbines without command before commencing any move, even if only individual men change places. In advancing in rushes, in skirmishing, the usual maximum length of each rush is fixed at 50 paces.

The second part, relating to mounted drill, specifies precisely the distances to be kept between ranks, and between divisions, etc.

Drilling by signal, for some time in use in the German cavalry, is now recognized by the regulations. Facing about is now always performed to the left.

"Plastomenite" is the name of a new smokeless powder invented by a German. It is made in a solution and poured into forms, where it becomes a fairly hard substance, capable of being rolled, pressed, etc. The substance can be colored at will, and, like celluloid, can be used for numerous purposes. It is used for blasting-powder, powder for great guns and rifles, signal-rockets, etc. The greatest advantage claimed for it is durability, while all other smokeless powders are said to invariably deteriorate.

The combustion is said to be so well balanced that it leaves no residue in barrel or cartridge, although the striking velocity of the projectile is unusually great. The initial velocity from a 6½-millimetre calibre is 715 metres, with a pressure of below 3000 atmospheres. It is claimed that neither heat nor cold produce any appreciable effect on the plastomenite cartridge. Hitherto this powder has been used only for sporting purposes, but its good qualities have attracted the attention of the German military authorities, and it is to be subjected to complete tests.

It is stated that Germany shortly intends to spend considerable money on an increase of the navy and on marine forts. A change of great importance, which it is said will shortly take place, is to replace the land artillery in the sea-coast forts by marine artillery; and these forts will be placed under control of the Admiralty.

By these changes it is expected that greater efficiency will result in the case of an artillery fight with a hostile fleet, marine officers by their acquaintance with ships knowing better how to make the most effective attacks against ships. This change also involves giving the control and placing of submarine mines and other harbor defenses to the marine artillery under control of the Admiralty.

Following out this plan, the size of the marine artillery will be much augmented.

Italy.

The Italian ironclad *Re Umberto*, one of the largest of the new ironclads for the Italian government, has had her official trials for acceptance by the Italian government. The trials proved of a highly satisfactory character. The contract stipulated for the development of 15,200 horse-power natural draft and 19,500 forced draft, but as hereafter shown the government decided to abandon the forced draft trials. The run was made from Spezia to Genoa and back, a distance of 120 knots, at an average speed of 18.3 knots, the engines indicating a mean of about 17,000 horse-power with ½ inch of air-pressure in the stokeholds. The *maximum* power during the run was found to be 19,000 horse-power, and the *maximum* speed 18½ knots, which was obtained by only ½ inch of air-pressure. The machinery worked smoothly in every respect, no water service being used. The boilers gave a plentiful supply of steam without priming or other difficulties. The results were considered so satisfactory from every point of view, both as regards the speed of the vessel and the facility with which the speed could be maintained,—the trial being made by the ordinary ship's crew and not by special stokers,—that the commission appointed recommended the Marine Ministry to accept the machinery without further trials, as it appeared so obvious that the horse-power with forced draft would largely exceed the contract power of 19,500 horses. The recommendation was, therefore, accepted by the Ministry of Marine. This powerful ironclad is fitted with four 34-centimetre 67-ton Armstrong guns, eight 15-centimetre guns, sixteen 12-centimetre quick-firing guns, ten 5.7-centimetre quick-firing guns, and seventeen 3.7-centimetre quick-firing guns, and two machine guns. The dimensions of the ship are as follows: Length, 400 feet; beam, 76.9 feet; draught, 28.6 feet.

Argentine Republic.

The composition of the Argentine army, according to the new scheme of organization, is as follows: 12 regiments of infantry, each of 2 battalions of 250 men, 10 regiments of cavalry, 1 regiment of mountain artillery, 4 regiments of field artillery, 1 regiment of engineers.

The normal strength will then be: Infantry, 254 officers, 3743 men; cavalry, 183 officers, 1887 men; artillery, 114 officers, 1205 men; engineers, 13 officers, 161 men: total, 564 officers, 6996 men.

Spain.

The Spanish cruiser *Infanta Maria Teresa* has completed her steaming trials with the following results. The vessel steamed four and one-half hours under forced draft and attained a speed of 20.15 knots with 13,750 horse-power. Her speed under natural draft (9558 horse-power) was 18.5 knots.

PHILIP ANDREWS,
Ensign U.S.N.

SERVICE SALAD.

The "Shenandoah's" Story. Told by an Officer of the last Confederate Privateer.

(*From the St. Louis Republic.*)

BOSTON, November 24.—Dr. F. J. McNulty, of 706 Huntingdon Avenue, Boston, was one of the officers of the Confederate war-ship "Shenandoah," which on the 5th of November, 1865, flung to the breeze for the last time the stars and bars. Asked by the writer to relate the story of the cruise of the "Shenandoah" and the last wave of the Southern flag, a few days since, the doctor told this thrilling tale of the last terror of the seas, whose track was marked by a line of fire around the earth, from the tropics to the Arctic, while she gave the whaling marine of the United States its fatal blow.

"On the evening of the 8th day of October, 1864," said he, "there met on Princesses Dock, Liverpool, twenty-seven men. They were nearly unacquainted with each other, and knew nothing of their destination. All were officers of the Confederate navy, by commission or warrant, and each had his distinct order to report at this place at the same hour. My commission was that of assistant surgeon. A tug was waiting, and we were hurried upon its dock with great haste. In the stream lay the steam blockade-runner 'Laurel.' In the shortest time imaginable we were hustled on board this craft and were standing down the stream. At the same hour, casting off her lines from her London docks and moving down the Thames with her grim dogs of war concealed between her decks, ostensibly a merchantman and bound for Bombay, sailed the English ship 'Sea King.' One week later the ships met in the harbor of Funchal, Madeira. But the captain of the port ordering us out of his waters in the name of his sovereign of Portugal, we raised anchor and found an offing beside the three great Desertas, massive rocks that rise out of the blue bosom of the Atlantic. Here the ships were lashed together, and the 'Sea King' received from the 'Laurel,' which was loaded deep, arms, ordnance, and coal sufficient for an extended voyage of a man-of-war.

"This done, the crews of both vessels were ordered on board the 'Sea King,' when James I. Waddell, going down into her cabin, soon reappeared on deck clad in full uniform and bearing the side arms of a Confederate naval captain. Holding his commission for such office in his hand he read it to the assembled crews and closed in a brief address, declaring that his ship, late the 'Sea King' of England, should now and forever be known as the Confederate States war-ship 'Shenandoah;' that her object should be to prey upon and destroy the commerce of the United States, and that all of either crew, the 'Laurel's' or the 'Sea King's,' who wished to enlist their lives and services in the defense of the Confederate cause on board this ship might now do so.

"Immediately after this the lashings were cast off and guns of salute in parting fired by the two vessels. The 'Laurel' turned her prow to England and we to the South Seas. Never before was ship beset by difficulties apparently so insurmountable. Demanding a complement of one hundred and sixty men, we bore away that day a ship-of-war with forty-seven men all told. Although liable at any hour to meet the challenge shot of the enemy, we entered upon our duties

without fear. There was work for every man to do, and every man put his heart in his task. Boxes, trunks, casks of beef and bread, coal, and ordnance lay promiscuously about the deck and below. Then when, after days of toil with blistered hands, all was stored properly below, and while the carpenter and his mates cut port-holes for the guns, the captain took his trick at the wheel, and officers and men, regardless of rank, barefooted and with trousers rolled up, scrubbed and holystoned decks. Yet in that strangely gathered body of men was some of the best blood of the South. Historic names were there. Lieutenant Lee, son of Admiral Lee, commandant of the Philadelphia Navy-Yard at the opening of the war, and nephew of General Robert E. Lee, was our third lieutenant, and had seen service on the 'Georgia' and 'Florida.' Our chief engineer and paymaster were from the 'Alabama,' and every commissioned officer was a graduate of the Naval Academy at Annapolis, and had seen previous service.

"The 'Shenandoah' was built of teak, an Indian wood. She had quarter-inch iron plating, as well as iron knees and stanchions. Of eleven hundred and sixty tons English register, three hundred and twenty feet in length and thirty-two in breadth, her average speed was thirteen knots, though, when entirely under sail, with propeller unshipped and sails up, she often outdid this. At one time, sailing down the Indian Ocean, she made for four consecutive hours the high average rate of eighteen knots.

"The morning of October 29 was clear and bright, and was made memorable by our first visitors on board. The stranger showed chase, but quickly changed his mind when a hustling shot across his bows said, 'Do come and see us,' the first of fifty pressing invitations. Of this vessel's complement of ten men, eight joined our crew. After our first capture, sailing steadily to the South Seas, and destroying a ship nearly every other day, on the evening of November 15 we were on the equator. Here his most saline and anciently enthroned majesty came on board and brought with him his numerous retinue, and the ceremony of becoming naturalized citizens of the deep had to be submitted to, many of the officers, including the assistant surgeon, undergoing the tonsorial brushing up of old Neptune. In these warm southern waters, with a clear sky and little to do, our quota of men was now nearly made up—the hours seemed like links of sunshine. In the enchantment of the bright dream one would forget at times that our occupation was less than peace. Then suddenly a sail would be descried, and all would be bustle,—topsails would be shaken out, and forging ahead, our gun would ring out the iron voice of war. The lowering of a flag and transferring of a crew would follow, and then in flame would go up to the blue sky one more of the enemy's ships, leaving a blot in the memory of an otherwise cloudless tropical day.

"On the 27th of December we made the harbor of the Island of Tristan de Acunha, the principal of a group of islands in the South Atlantic. In its seventeen families nearly all the principal nations are represented. Here we landed our prisoners and left them a three months' supply of provisions. Fortunately for us, we made a short stop at this island, for afterwards, when in Europe, we were told that just twelve hours after we had left the harbor the United States man-of-war 'Iroquois' steamed in, and, hurriedly taking on board the prisoners, weighed anchor and stood for Cape Town, a favorite rendezvous of the 'Alabama.' Happily, we were bound for Melbourne, and did not stand near the cape in doubling it. On the 25th day of January, 1865, we entered the port of Melbourne. Never was conquering flag at peak hailed with half such honors as were given us upon that bright tropical morning. Steamer, tugboat, yacht,—all Melbourne, in fact, with its one hundred and eighty thousand souls, seemed to have outdone itself in welcome to the Confederates. Flags dipped, cannon boomed, and men in long thousands cheered as we moved slowly up the channel and dropped anchor. The telegraph had told of our coming from down the coast, where we had been sighted with Confederate flag flying, and the English papers had said that the

great Semmes was on board. Evidently the heart of colonial Britain was in our cause. Our stay in Melbourne was one round of pleasure and honor. We were given free rides on the railroads to any point. From commander down to grayback, all had their free passes. The wealthiest clubs in Melbourne elected us honorary members. Barry Sullivan, then playing 'Othello,' gave us an especial night, when, with true British gusto, the flaring bills read, 'Under the distinguished patronage of the officers of the Confederate steamship "Shenandoah."' There we looked down upon an auditorium packed to suffocation as we sat in the royal box. One hundred miles away, at Ballarat, a red-letter day was set apart for our reception. Only seven of us could attend. The entire town turned out to greet us, and across the main street, on a triumphal arch of flowers, were the letters, 'Welcome to Ballarat.'

"At length, on the 28th of February, we put to sea, with our full complement of men, and on the 1st of April entered the harbor of Ascension Island. Here in this little, almost landlocked, harbor were four whalers, and after the bare-legged king of the islands had condescended to say where he wished them sunk so as not to destroy good anchorage in his harbor, we set fire to and scuttled the fleet. Great events were going on then at home, but we were oblivious of their occurrence. With prow to the north we found ourselves on the 27th of May in the Okhotsk Sea, off the coast of Kamchatka. Here we destroyed the ship 'Abigail,' of New Bedford. We sailed into Behring Sea, and chasing a bark, which proved to be the 'Robert Downs,' an Englishman with Russian flag flying, we answered to his call that we were the 'Prince Petropoliski,' bound for a cruise. Our boatswain, a broad Milesian with a touch of Sclav upon his tongue, was our spokesman, therefore it was easy to imagine how this name must have sounded through the trumpet from such an anti-Russian source.

"On the 27th of June, after destroying much shipping in Behring Sea, we captured the 'Susan Abigail,' twenty-eight days from San Francisco. Then, for the first time, we heard that the war was over. But as the captain could show no proof, not even a newspaper, we set it down as a smart Yankee trick, thought of to save his ship. On the 5th of July occurred our greatest day's work—perhaps the greatest destruction ever served upon an enemy in a single day by one ship. The morning came heavy and thick with fog. Suddenly across our bows swept something; in the fog we thought we could outline a ship. A gun brought to a bark. Soon her flaming form broke upon the fog and told her fate. She had nearly run us down in the thickness of the weather. The fog now rising disclosed a wide bay or homestead, in which were anchored with their sails half furled a large fleet of whaling vessels of every rig. They were mostly from New Bedford. Before entering upon our work we counted them: there were eleven. Soon the work of demand, surrender, debarkation, and conflagration began. Two were saved and bonded to take home the other crews. Then followed the torch and auger. Never before had these far latitudes beheld such a dread scene of devastation as this, as ship after ship went up in flame. We had been ordered to wipe out the whaling marine of the enemy, and now, after the government that had so ordered had been itself destroyed, we, unwittingly, were dealing the enemy our hardest blows—not our enemy, if we knew the facts, and we were making of ourselves the enemy of mankind.

"Re-entering the Arctic seas we cruised some days without success. Then turning back to Behring Sea we pointed our prow to the south. The second day of August was clear and bright and the sea smooth. The cry of 'A sail' brought all minds to attention. But alas, it was not to revive the old scenes. The 'Shenandoah' had done her last work, and the now oncoming craft was to bring to us tidings of consternation and despair. She showed the English flag, but this to us was a small matter. Half our prizes had done this. Her double topsail yards (a Yankee rig) were thought sufficient identity. She proved, however, to be the English ship 'Barracoutta,' two days out from

San Francisco. Her captain informed our boarding officer that the war was over, and produced New York and San Francisco papers telling us for the first time of the great and closing scenes of the fearful drama: the surrender of Lee, the capture of Richmond, the assassination of Lincoln, and the final collapse of the Confederacy. Quick as thought Captain Waddell now swung his guns between decks, closed the port-holes, and the 'Shenandoah' was again a craft of peace. A council of officers was now held to decide what course to pursue. The opinion of each was asked and given. Some were in favor of sailing to Melbourne, others for Valparaiso or New Zealand. Captain Waddell, although in the minority, decided in favor of Liverpool. We had no flag and no country, but we had sailed from England, and to England we would now return. We were not aware that from one of the bonded ships which we had sent to San Francisco with the crews of herself and others had gone the word by telegraph to Washington of our depredations, and that President Johnson had issued a proclamation of outlawry against us.

"The crew of the 'Shenandoah' were now all called aft, and Captain Waddell, in a brief address, told them of our altered condition, and of his decision to sail to Liverpool. The men gave three cheers for their commander and pressed forward to their duties with a will, while the ship's prow was pointed to Cape Horn. On our way we sighted many ships. Some, nearing us, would send up signals, but would receive no answer. We had lost our voice and manners with our occupation, and all we thought of now was to get to the other side of this terrestrial globe as soon as possible. We had but seven days' coal supply, and must husband this for an emergency. It came in rounding Cape Horn, when we were obliged by stress of weather to fall upon its use. We now laid our course for our destination, and every day was closing in the miles that separated us from our fate. On the 5th of November land was descried. Up from the water rose the rugged Welsh hills. Now the clear headlands of Anglesey, rising high out of St. George's Channel, stood more near, and a pilot swept alongside. He asks us to show our flag. We say we have no flag. Then answers this servant of the nations, 'I cannot go on board your ship.' A hurried consultation, an anxious exchange of inquiring looks—what shall we do now? we have but one flag—shall we raise it? It was the flag to which we had sworn allegiance. Shall we lift it once more to the breeze, in defiance to the world, if needs be, and, defying all, be constant to that cause which we had sworn to maintain until we knew there was no Confederacy, and that ours in truth was a lost cause? 'We will!' say all hearts, with one acclaim, 'and let this pilot or any other refuse to recognize us if they will.' Then, for the last time, was brought up from its treasured place below the sacred banner of the fair South, to wave its last defiant wave, and flap its last ensanguined flap against the winds of fate, before going forever upon the page of history. The grim old sea-dog tossing in his boat at stern beholds go up the outlawed banner. He calls for a line, swings himself over the old war-ship's side, and up the Mersey, thirteen months after the departure from the Thames, and just six months, lacking four days, after the war ended, sailed the Confederate ship 'Shenandoah.'

"Half way up the river a fleet of English men-of-war lay anchored in the channel. The pilot was directed to bring his vessel to anchor alongside the flag-ship, her Majesty's frigate 'Donegal,' Captain Painter. Surrendering to that officer, Captain Waddell immediately despatched a note to Earl Russell, at that time premier, stating his situation, that at the close of hostilities he was engaged in open war far away from any means of communication with the world, and that as soon as he was informed of the tide of events he had headed his ship for England: that it would have been imprudent for him to have sailed for a United States port, having only a newspaper report of the close of hostilities. Uncertain what to do, he had sailed for England. He did not feel that he could destroy his ship or give her over to any nation but to the United States, into whose hands by the fortune of war all other property of the late Confederacy

had fallen. He had sought for light in the books at his command, but could find none. History, he thought, left him no precedent. Three days of intense suspense followed, when we were informed that all who answered to the question, 'What nationality?' and should answer, 'Southerner,' should be entitled to leave the ship. Of course all answered as they were instructed, and officers and crew parted as they had met on that Liverpool dock thirteen months before.

"The ship was turned over to the United States Consul at Liverpool, who tried to send her to America, but she refused. Three days out she encountered a heavy storm and returned in a battered condition. After some months lying elephant-like on the hands of the American Government, she was sold at auction to the Sultan of Zanzibar, who used her as a pleasure craft. But some years later she foundered with all on board."

An Elm-Tree on a Frosty Morning.

(*From the Pall Mall Gazette.*)

SHOWERS of gold! they are silently falling,
Falling to earth in the stillness of pain;
Daintily decking the bosom that bore them,
Fitting the soil for fresh service again.

Tell not of darkness, of damp or decaying,
Clear is the sky, never brighter the sun!
Sing of the Future, the glorious uprising,
Look to the summer when winter is done.

W. H. O.

Officers of the Army and Navy who were on Duty in Connection with the World's Columbian Exposition.

ARMY.

Special Commissioners under Department of State.—Captain Geo. P. Scriven, Signal Corps, Guatemala, Costa Rica, and Salvador; Captain Alexander Rodgers, Fourth Cavalry, Rio de Janeiro and Southern Brazil; Captain Gilbert P. Cotton, First Artillery, Honduras; Lieutenant H. C. Lemly, United States of Colombia.

Officers in charge of Government Exhibits, or in command of Troops under Orders of the War Department.

War Department: United States Government Building.—Major Clifton Comly, Representative of War Department; Captain John F. Rodgers, Quartermaster's Department; Captain L. A. LaGarde, Captain F. J. Ives, Lieutenant Geo. D. DeShon, Lieutenant John S. Kulp, Medical Department; Captain W. L. Marshall, Lieutenant Chester Harding, Engineers; Captain A. H. Russell, Ordnance Department; Captain R. E. Thompson, Signal Corps; Captain C. H. Heyl, Twenty-third Infantry.

Camp Lamont: United States Government Building.—Major G. M. Randall, Fourth Infantry, Commanding; Lieutenant J. A. Dapray, Twenty-third Infantry, Adjutant; Lieutenant A. M. Palmer, Twenty-fourth Infantry, Quartermaster; Lieutenant O. Bundy, Lieutenant C. G. Dwyer, Lieutenant P. A. Wolf, Lieutenant H. M. Reeves, Third Infantry.

Officers on Duty at Camp Lamont and detached during the Exposition.—Captain Frederick W. Cooke, Captain Fayette W. Roe, Third Infantry; Second Lieutenant John Howard, Nineteenth Infantry.

Camp at La Rabida.—Lieutenant G. McD. Weeks, Fifteenth Infantry, Commanding.

Department of State.—Captain A. A. Harbach, Twentieth Infantry, United States Government Building; Captain J. G. Bourke, Third Cavalry, La Rabida; Lieutenant C. W. Fenton, Seventh Cavalry, La Rabida.

Officers on Duty with Columbian Guard.—Captain Edmund C Rice, Fifth Infantry, Commandant, with rank of colonel; Captain F. A. Smith, Twelfth Infantry, Adjutant; First Lieutenant C. B. Hoppin, Second Cavalry, Quartermaster; First Lieutenant W. H. Gordon, Eighteenth Infantry, Assistant Adjutant; First Lieutenant R. J. C. Irvine, Eleventh Infantry; Captain W. M. Baird, Sixth Cavalry; Second Lieutenant G. H. Preston, Ninth Cavalry; First Lieutenant M. F. Jamar, Thirteenth Infantry; Captain E. J. McCler-

nand, Second Cavalry; First Lieutenant J. L. Wilson, Fourth Artillery; Captain W. S. Schuyler, Fifth Cavalry; Captain J. Pitcher, First Cavalry; First Lieutenant R. F. Ames, Eighth Infantry; First Lieutenant S. M. Foote, Fourth Artillery; Second Lieutenant C. L. H. Ruggles, Third Artillery; Second Lieutenant E. M. Lewis, Eleventh Infantry; First Lieutenant Geo. H. Morgan, Third Cavalry; First Lieutenant W. C. Brown, First Cavalry; Second Lieutenant H. E. Ely, Twenty-second Infantry; First Lieutenant A. Pickering, Second Cavalry; First Lieutenant H. S. Whipple, Seventh Cavalry; First Lieutenant J. O. Green, Twenty-fifth Infantry; Captain W. A. Shunk, Eighth Cavalry; Second Lieutenant E. Wittenmeyer, Ninth Infantry; Second Lieutenant Thos. J. Clay, Tenth Infantry; First Lieutenant E. W. Howe, Seventeenth Infantry; First Lieutenant C. B. Vogdes, First Infantry; Second Lieutenant W. A. Phillips, Twenty-second Infantry; Second Lieutenant E. A. Helmick, Fourth Infantry; First Lieutenant L. H. Strother, First Infantry; First Lieutenant Wm. H. Sage, Twenty-third Infantry; First Lieutenant S. F. Massey, United States army; Second Lieutenant Winston, Fourteenth Infantry; First Lieutenant R. C. Williams, Second Infantry; First Lieutenant W. M. Swaine, Twenty-second Infantry; First Lieutenant Chas. W. Penrose, Eleventh Infantry; First Lieutenant S. W. Miller, Fifth Infantry; First Lieutenant H. J. McGrath, Fourth Cavalry; First Lieutenant John J. Pershing, Tenth Cavalry; Captain G. D. DeShon, United States army; Second Lieutenant W. J. Lutz, Second Infantry; Second Lieutenant M. McFarland, Twenty-First Infantry; Second Lieutenant M. G. Krayenbuhl, Second Artillery; First Lieutenant H. C. Hale, Twentieth Infantry; First Lieutenant C. G. Starr, First Infantry; Second Lieutenant E. Hinds, Second Artillery; First Lieutenant T. M. Defrees, Fifth Infantry; Second Lieutenant J. W. Furlong, First Cavalry; Second Lieutenant W. J. Glasgow, First Cavalry; First Lieutenant H. Liggett, Fifth Infantry; First Lieutenant J. J. Haden, Eighth Infantry; Second Lieutenant G. T. Langhorne, Third Cavalry; First Lieutenant S. C. Mills, Twelfth Infantry; Second Lieutenant W. T. Johnson, Tenth Cavalry; First Lieutenant P. G. Wood, Twelfth Infantry; First Lieutenant C. B. Baker, Seventh Infantry; First Lieutenant S. L. Faison, First Infantry; First Lieutenant John W. Heard, Third Cavalry; Captain Alfred Reynolds, Twentieth Infantry; Second Lieutenant George D. Moore, Eighteenth Infantry; Captain J. A. Irons, Twentieth Infantry; Second Lieutenant C. P. Echols, Engineer Corps; Captain W. S. Scott, Twenty-fifth Infantry; Lieutenant R. G. Paxton, Tenth Cavalry; Lieutenant H. G. Cole, Twenty-third Infantry; Second Lieutenant Jas. A. Ryan, Tenth Cavalry; First Lieutenant S. Rice, Seventh Cavalry; First Lieutenant E. P. Brewer, Seventh Cavalry; First Lieutenant Geo. L. Godfrey, Twenty-second Infantry; Second Lieutenant S. Grosby, Engineer Corps; Second Lieutenant W. Uline, Twelfth Infantry; Second Lieutenant W. M. Whitman, First Cavalry; First Lieutenant W. E. P. French, Third Infantry; First Lieutenant L. D. Green, Seventh Infantry Second Lieutenant H. O. Clark, Twenty-third Infantry; Second Lieutenant Chas. Keller, Second Lieutenant J. B. Cavanaugh, Engineer Corps.

Sergeant-at-Arms to National Commission.—First Lieutenant R. J. C. Irvine, Eleventh Infantry.

Columbian Guard.—Maximum strength at any one time was two thousand one hundred and seven men, May 26, 1893, three hundred secret service men, ninety guides or special service corps.

NAVY.

Commodore Richard W. Meade, Representative, Navy Department, July, 1890.

Lieutenant-Commander E. D. Taussig, Assistant to the Representative of the Navy Department, December, 1890. Relieved Commodore Meade as the representative of the Department May, 1892.

Special Commissioners under Department of State.—Lieutenant Asher C. Baker, Mexico; Lieutenant Frank E.

Sawyer, Para and Amazonian Basin; Lieutenant Chas. H. Harlow, Chile; Ensign William E. Safford, Peru and Bolivia: Ensign Rodger Welles, Jr., Venezuela, Trinidad, Barbadoes, Curaçao, and Guiana; Surgeon D. N. Bertollette, Uruguay, Paraguay, and Argentine Republic.

In Connection with World's Columbian Exposition.—Lieutenant-Commander F. M. Symonds, in charge of Waters and Water-Transportation; Lieutenant G. C. Hanus, assistant; Chief-Engineer Lewis W. Robinson, in charge of Department of Machinery; Professor O. C. Dodge, in charge of Electrical Department (power and supply); Lieutenant Asher C. Baker, in charge of Department of Transportation (marine exhibits); Ensign Rodger Welles, Jr., Department of Foreign Affairs, later on Caravels; Ensign William E. Safford, Department of Foreign Affairs; Surgeon D. N. Bertollette, Aide to the Director-General.

On Duty in Connection with the Model Battle-Ship "Illinois."—Pay-Director Frank C. Crosby, Lieutenant James M. Helm, Lieutenant Homer C. Poundstone, Past-Assistant Engineer Frank M. Bennett, Past-Assistant Surgeon A. C. H. Russell, Ensign George P. Blow, Gunner John J. Walsh.

United States Naval Observatory.—Lieutenant Albert G. Winterhalter (special service with Exposition).

United States Marines: Camp Herbert (Naval Exhibit).—Captain B. R. Russell, Commanding, May 7, 1893, to July 28, 1893; Captain Paul St. C. Murphy, Commanding, August 4, 1893; First Lieutenant George Barnett, Second Lieutenant Cyrus C. Radford, on duty as guards to the exhibits of the Departments of the Navy and State.

United States Steamer "Michigan."—Lieutenant-Commander Robt. M. Berry, Commanding; Lieutenant Corwin P. Rees, Ensign Creighton Churchill, Surgeon Lloyd B. Baldwin, Past-Assistant Paymaster Jas. H. Chapman, Chief-Engineer John L. D. Borthwick.

United States Cruising Steamship "Blake."—Lieutenant Geo. W. Mentz, Commanding; Lieutenant John Gibson, Ensign Franklin Swift, Ensign Chas. S. Stanworth, Ensign Chas. M. McCormick, Assistant Surgeon Jos. A. Guthrie, Assistant Engineer Kenneth McAlpine.

TIME was when we looked to London publishers and English artists for dainty Christmas cards and illustrated calendars. That time has long since passed. Now L. Prang & Co., of Boston, lead in their chosen field of art-work. This year they issue a great variety of books, calendars, and cards that, in design and execution, easily surpass all that have gone before.

Messrs. Prang & Co. will send their catalogue to any of our readers who write them requesting it.

The Gloaming.

(*From Blackwood's Magazine.*)

A WISH at close of day,
The evening waits;
A hope, a morning ray
From Eastern gates;
A bright and sunny spot,
Along the stream;
A quiet, sheltered grot,
Where we can dream;
A window looking west,
Towards sunset gold,
Bespeaking gentle rest,
When we are old;
A glow in yonder sky
When shadows creep,
And love's soft lullaby
Inviteth sleep;
A hand to clasp in ours,
With pressure dear;
And then—some simple flowers
With friendships near;
A good-night gloaming kiss,
Life's day complete;
A lingering hour of bliss,
Where twilights meet.

A CORRESPONDENT asks me who wrote the sentence, "Procrastination is the thief of time." It will be found in the works of Edward Young, an English clergyman who flourished in the earlier part of the last century, contemporary with Addison, Pope, and Swift. The whole passage from which the above phrase is taken is extremely fine, many

of the lines being stronger than the one which has become axiomatic in current literature. "How excellent that life they ne'er will lead" has in it a world of wisdom and admonition.

"Be wise to-day; 'tis madness to defer;
Next day the fatal precedent will stand,
Thus on till wisdom is push'd out of life.
Procrastination is the thief of time;
Year after year it steals, till all are fled,
And to the mercies of a moment leaves
The vast concerns of an eternal scene.
If not so frequent, would not this be strange?
That 'tis so frequent, this is stranger still,
Of man's miraculous mistakes this bears
The palm, 'That all men are about to live'—
Forever on the brink of being born.
All pay themselves the compliment to think
They one day shall not drive! and their pride
On this reversion takes up ready praise;
At least, their own; their future selves applaud
How excellent that life they ne'er will lead!
Time lodg'd in their own hands is folly's vail,
That lodg'd in fate's to wisdom they consign;
The thing they can't but purpose, they postpone,
'Tis not in folly, not to scorn a fool;
And scarce in human wisdom to do more.
All promise is poor dilatory man,
And that through every stage!"

London Snow.

When men were all asleep the snow came flying,
In large white flakes falling on the city brown.
Stealthily and perpetually settling and loosely lying,
Hushing the latest traffic of the drowsy town;
Deadening, muffling, stifling its murmurs failing;
Lazily and incessantly floating down and down;
Silently sifting and veiling road, roof, and railing;
Hiding difference, making unevenness even,
Into angles and crevices softly drifting and sailing.
All night it fell, and when full inches seven
It lay in the depth of its uncompacted lightness,
Its clouds blew off from a high and frosty heaven;
And all awoke earlier for the unaccustomed brightness
Of the winter dawning, the strange unheavenly glare:
The eye marveled—marveled at the dazzling whiteness;
The ear hearkened to the stillness of the solemn air;
No sound of wheel rumbling nor of foot falling,
And the busy morning cries came thin and spare.

Robert Bridges.

To ——.

(*From the Temple Bar.*)

I sang to-night "The Arrow and the Song,"—
I have not sung it since I sang with you,—
I sang and wondered if the words were true,
And whether sometimes you—amidst the throng
Who flatter—love perhaps—but love not long,
Or love all selfishly, as most men do—
Remember one, who did not care to sue
As they,—preferring, whether right or wrong,
To take what you should give, and ask no more;
Content to leave, if you would have it so,
Your presence and continue, as before,
His singing to the air,—nor ask to know
The fate of one poor word till death's sweet shore
The truth or falseness of the song shall show.

MILITARY ORDER OF THE LOYAL LEGION OF THE UNITED STATES.

Companions of the Loyal Legion are invited to contribute to this department. News of the Commanderies is always welcome, but suggestions likely to inure to the benefit of the whole organization are of higher value, and therefore particularly desired. The pages of the Loyal Legion Department of the "United Service" are always at the service of members of the Order desiring to discuss matters of general interest to their comrades of the Military Order of the Loyal Legion.

New York Commandery.

Stated meeting held December 5, 1893.

To the First Class.—First Lieutenant **Pryce W. Bailey**, U.S.V.; First Lieutenant **Chas. J. Buchanan**, U.S.V.; First Lieutenant **James Casey**, U.S.V.; Captain **Benjamin F. Dexter**, U.S.V.; First Lieutenant **M Nelson Dickinson**, U.S.V.; Second Lieutenant **Thomas H. Fearey**, U.S.V.; Surgeon **David Little**, U.S.V.; Captain **William J. Morgan**, U.S.V.; Second Lieutenant **Henry M. Nevius**, U.S.V.; First Lieutenant **Robert C. Sides**, Jr., U.S.V.; Second Lieutenant **David A. Teller**, U.S.V.

To the First Class (by inheritance from deceased officer).—**Dr. Percy Bryant.**

Minnesota Commandery.

Membership, December 1, 1893: Resident members, 200; non-resident members, 108. First Class, original, 248; First Class, in succession, 4; First Class, by inheritance, 30; Second Class, 22; Third Class, 4.

District of Columbia Commandery.

Stated meeting held December 6, 1893.

To the First Class.—Captain **Martin Van Buren Bachman**, U.S.V.; Commodore **Oscar Charles Badger**, U.S.N.; Medical Director **Grove Spooner Beardsley**, U.S.N.; Acting Ensign **Henry Thomas Blake**, late U.S.N.; Colonel **Clarence Buel**, U.S.V.; Major-General **Napoleon Jackson Tecumseh Dana**, U.S.V.; Captain **William Ennis**, U.S.A.; Lieutenant-Colonel **William Adams McKellip**, U.S.V.; Brevet Captain **Robert Gedney Rutherford**, U.S.A.; Chief Engineer **William H. Rutherford**, U.S.N.; Captain **Alfred Bronaugh Taylor**, U.S.A.

Companion Brevet Major **Truman N. Burrill**, late U.S.V. (Insignia 7100), suspended February 1, 1893, was "Dropped from the Roll," under provisions of Section 3, Article XV., Constitution.

The resignation of membership in the order by Companion **Mark Burckle Hatch**—Second Class—(Insignia 4731), was accepted by unanimous vote.

Maine Commandery.

Stated meeting held December 6, 1893.

To the First Class.—Assistant Surgeon **Andrew R. G. Smith**, U.S.V.; Acting Master **Joseph A. Titcomb**, U.S.N.; Lieutenant **Daniel L. Warren**, U.S.V.

Illinois Commandery.

Stated meeting held November 9, 1893.

To the First Class.—Lieutenant **O. C. Towne**, U.S.V.

Colorado Commandery.

Stated meeting held December 5, 1893.

To the First Class.—Captain **W. W. Robinson**, Jr.

To the Second Class.—**George F. Platt, Gardner Washburn.**

TRANSFERS.

New York Commandery.

Captain **N. W. Meserole**, U.S.V., to Illinois Commandry; Colonel **L. L. Langdon**, U.S.A., and Medical Director **A. L. Gihon**, U.S.N., to District of Columbia Commandery.

District of Columbia Commandery.

Medical Director H. M. Wells to New York Commandery.

Colorado Commandery.

General Carlos J. Stolbrand, U.S.V., to New York Commandery.

Ohio Commandery.

Major F. S. Bond, U.S.V., to New York Commandery.

NECROLOGY.

Maine Commandery.

Commodore O. A. Batchellar, U.S.N., October 30, 1893.

New York Commandery.

Lieutenant George W. Ford, U.S.V., October 29, 1893; Mr. Edward D. Ransom, November 12, 1893.

Michigan Commandery.

Charles W. Wells, October 19, 1893.

District of Columbia Commandery.

Colonel Charles Fair, U.S.V., October 14, 1893; Admiral W. W. Queen, U.S.N., October 21, 1893.

Colorado Commandery.

Colonel G. G. Symes, U.S.V., November 4, 1893.

Wisconsin Commandery.

Brevet Major Charles G. Mayers, U.S.V., October 21, 1893.

The Commandery-in-Chief.

Instituted October 22, 1885. Headquarters, Philadelphia, Pennsylvania.

Officers elected to serve two years at ninth annual meeting: Commander-in-Chief, Brigadier-General Lucius Fairchild, U.S.V.; Senior Vice Commander-in-Chief, Colonel Nelson Cole, U.S.V.; Junior Vice Commander-in-Chief, Commodore Henry Erben, U.S.N.; Recorder-in-Chief, Brevet Lieutenant-Colonel John P. Nicholson, U.S.V.; Registrar-in-Chief, Brevet Brigadier-General Albert Ordway, U.S.V.; Treasurer-in-Chief, Brevet Colonel Cornelius Cadle, Jr., U.S.V.; Chancellor-in-Chief, Captain Peter D. Keyser, U.S.V.; Chaplain-in-Chief, Chaplain H. Clay Trumbull, U.S.V.; Council-in-Chief, Brevet Brigadier-General Orlando M. Poe, U.S.A.; Brevet Colonel Horatio C. King, U.S.V.; Brevet Brigadier-General John Marshall Brown, U.S.V.; Colonel Arnold A. Rand, U.S.V.; Brevet Major William P. Huxford, U.S.A.

STRENGTH OF COLORADO COMMANDERY.

November 21, 1893.

Original First Class members	161
First Class, in succession	2
First Class, by inheritance	11
Second Class	15
Total	189

STRENGTH OF WISCONSIN COMMANDERY.

November 25, 1893.

First Class, original	191
First Class, in succession	2
First Class, by inheritance	10
Second Class	7
Third Class	2
Total	212

STRENGTH OF NEW YORK COMMANDERY.

November 20, 1893.

First Class, original	952
First Class, in succession	41
First Class, by inheritance	50
Second Class	61
Third Class	4
Total	1108

The October report shows the strenth of the Iowa Commandery to be:

First Class, original members	141
First Class, by inheritance	10
Second Class	8
Third Class	4
Total	163